High Precision Electro-Weak Quantum Loops: Standard Model predictions for the top-quark and Brout-Englert-Higgs scalar masses, later confirmed by their discovery, contributed directly to the awards of Two Nobel Prizes in Physics

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The Standard Model (SM), augmented by massive neutrinos and classical general relativity, has never failed a legitimate experimental or observational test. The stakes for LEP, SLC, Tevatron and LHC were immense! Either the SM's reliable high-accuracy predictions for the top-quark and Brout-Englert-Higgs scalar (BEH) masses were true, and experimentally/observationally verified, or we had to change this most basic SM paradigm. Instead, with the experimental discovery of the top-quark in 1995 and the BEH scalar in 2012, the High Precision Electro-Weak Quantum Loop (HP-EW-QL) structure of the SM was completely vindicated.

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I. THE CORE THEORY IS VINDICATED

The Standard Model [162–164], augmented with right-handed neutrinos and neutrino masses (the Minimal νSM [165–167]) and classical general relativity, is the most powerful, accurate, predictive, successful and experimentally/observationally verified theory known to science. It has never failed a legitimate experimental or observational test. Frank Wilczek [355] calls it the "Core Theory".

With discovery of the Brout-Englert-Higgs (BEH) scalar (aka "Higgs"), the SM has now been experimentally completely vindicated. Most pursuasive is its renormalizable/unitary quantum loop structure, tested with High-Precision Electro-Weak Quantum Loops (HP-EW-QL), notably at CERN's LEP and SLAC's SLC e^+e^- colliders with center-of-mass energy on/near the Z-pole. The most powerful HP-EW-QL tests are:

- Successful 1984 Z-pole physics 1-loop HP-EW-QL prediction for the top-quark mass [670, 682] led to the award of the 1999 Nobel Prize in Physics for the renormalizability/unitarity of spontaneously broken Yang Mills gauge theories [367];
- Successful 1984 Z-pole physics (1-loop [670, 682], augmented by certain 2-loop [858]) HP-EW-QL prediction for m_{BEH}. The eventual ultra-high-accuracy July 2011 prediction, in Figure 4, led to its July 4, 2012 LHC discovery at $m_{BEH} = 125$ GeV, and contributed to the award of the 2013 Nobel Prize in Physics [368].
- 2-loop prediction for the $W^{\pm}$ mass [175, 386, 625, 670, 682, 858], also contributed to the successful predictions of the top-quark and BEH masses, and the associated 1999 and 2013 Nobel Prizes [367, 368].
- The 1-loop predictions for the $W^{\pm}$ and Z^0 masses, using neutrino-hadron data, contributed to their 1983 discovery, and the 1984 Nobel Prize in Physics [176]
- The classification [178, 354, 369, 676, 740, 746, 779**?**] of "oblique" HP-EW-QL has also experimentally ruled out vast swaths of "Beyond the Standard Model (BSM)" theoretical high energy physics (HEP).

Renormalizability, unitarity, infra-red finiteness and practical calculability for the Standard Model was conceived/invented and brought to mathematical and computational maturity (by 1979) by the seminal work of: G. 't Hooft, M.J.G. Veltman, L.D.. Fadeev, V.N. Popov, J. Goldstone, Y. Nambu, A. Salam, S. Weinberg, J.C. Ward, J.C. Taylor, A.A. Slavnov, C. Becchi, A. Rouet, R. Stora, I.V. Tyutin, D. Yennie, S. Frautschi, A. Surra, F. Behrends, T. Kinoshita, A. Sirlin, G. Passarino and M. Consoli.

The theoretical part of the field is now widely regarded as having been completed [155]: i.e. as a scientific and mathematical field of theoretical discovery.

But, since the 1-loop and certain 2-loop quantum structure was directly and reliably derived from the SM, the experimental stakes in 1994 were immense: either the Standard Model's reliable predictions for m_{top}, m_{BEH} were true (and eventually verified), or we had to change this most basic paradigm. Instead, with the discovery of the top-quark in 1995, and the SM BEH scalar in 2012, the quantum-loop structure of the SM was completely vindicated.

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HP-EW-QL is now so conclusively experimentally validated that it is widely regarded as an engineering and technology skill, used, for example, to calculate LHC signals and backgrounds.

But there are those of us who believe that the Standard Model still has a few tricks [381] up its sleeve: e.g. new mathematical symmetry properties [382–385, 660–663, 769, 770, 948–952] and game-changing scientific discoveries [771–776].

II. OBLIQUE HP-EW-QL

The 2-point A (photon) and Z self-energies, $Z-A$ mixing and $W^\pm$ self-energy 1-particle-irreducible connected truncated Green's functions are first defined, by separating out gauge coupling constants, in term of the $SU(2)_L$ isospin current $\vec{J}^\mu$ and electromagnetic current J^μ_Q:

$$\begin{aligned}
\Pi_{AA}(q^2) &= q^2 e_*^2 \Pi'_{QQ} \\
\Pi_{ZA}(q^2) &= \frac{e_*^2}{s_* c_*}\left[\Pi_{3Q} - q^2 s_*^2 \Pi'_{QQ}\right] \\
\Pi_{3Q}(q^2) &= q^2 \Pi'_{3Q} + \Pi^L_{3Q} \\
\Pi_{ZZ}(q^2) &= \frac{e_*^2}{s_*^2 c_*^2}\left[\Pi_{33} - 2 s_*^2 \Pi_{3Q} + q^2 s_*^4 \Pi'_{QQ}\right] \\
\Pi_{WW}(q^2) &= \frac{e_*^2}{s_*^2}\Pi_{+-}
\end{aligned} \tag{1}$$

We supress Lorentz indices, for the moment, by writing the 2-point functions in Landau gauge. The running $*$ couplings are defined below.

A. Gauge-independent running couplings

When the more general scalar sector considered in [740] is specialized to a single BEH doublet

$$\begin{aligned}
\frac{1}{e_*^2(q^2)} &= \frac{1}{e_*^2(\mu^2)} - Re\Big(\Pi'_{QQ} + 2\Gamma'(\xi)\Big)_{q^2} \\
&\quad + Re\Big(\Pi'_{QQ} + 2\Gamma'(\xi)\Big)_{q^2=\mu^2} \\
\frac{1}{4\sqrt{2}G^*_\mu(q^2)} &= \frac{1}{4\sqrt{2}G^*_\mu(\mu^2)} \\
&\quad + Re\Big(-\Pi_{+-} + q^2\Pi'_{3Q} + 2\Pi^L_{3Q}(\xi)\Big)_{q^2} \\
&\quad - Re\Big(-\Pi_{+-} + q^2\Pi'_{3Q} + 2\Pi^L_{3Q}(\xi)\Big)_{q^2=\mu^2} \\
\frac{1}{\rho^*(q^2)} &= 1 - 4\sqrt{2}G^*_\mu(q^2) Re\Big(\Pi_{33} - \Pi_{+-}\Big)_{q^2}
\end{aligned}$$

$$\begin{aligned}
\frac{1}{g'^2_*(q^2)} &= \frac{1}{g'^2_*(\mu^2)} - Re\Big(\Pi'_{QQ} - \Pi'_{3Q}\Big)_{q^2} \\
&\quad + Re\Big(\Pi'_{QQ} - \Pi'_{3Q}\Big)_{q^2=\mu^2}
\end{aligned} \tag{2}$$

where μ^2 indicate an arbiitrary set of 3 renormalization points. Written this way, the 1-loop running couplings are manifestly independent of renormalization scheme. With the further definitions

$$\begin{aligned}
e_*^2 &\equiv \frac{g_*^2 g'^2_*}{g_*^2 + g'^2_*} \equiv g_*^2 s_*^2 \equiv g'^2_* c_*^2 \\
s_*^2 &+ c_*^2 = 1
\end{aligned} \tag{3}$$

$s_*^2(q^2)$ is the sin^2 of the running mixing angle. The leading UV logs in (2,3) match those of the renormalization group beta functions, but also include all of the analytic and infra-red terms from the vector self-energies.

Gauge-independence of running couplings: Although the transverse vector 2-point functions Π'_{QQ}, Π'_{3Q} are gauge-independent, the longitudinal parts of massive $W^\pm, Z$ and Z-photon mixing 2-point functions, $\Pi_{+-}, \Pi_{33}, \Pi^L_{3Q}$, are gauge-dependent. The gauge-dependent vertex-function $\Gamma'(\xi;q^2)$ and longitudinal $\Pi^L_{3Q}(\xi;q^2)$ are related (with oblique 1-loop improvements)

$$\Pi^L_{3Q} = -\frac{e_*^2}{4\sqrt{2}G^*_\mu s_*^2}\Gamma' \tag{4}$$

and are **universal**: i.e. they do not depend on the external particles of the particular S-Matrix element being considered. Their job is to cancel the longitudinal parts of the Z, $W^\pm$ and $Z-A$ mixing 2-point functions, thus ensuring manifest gauge-independence [740] of the effective running couplings in G. 't Hooft's R_ξ gauges. G. Degrassi and A. Sirlin [391], and independently M. Kuroda, G. Moultaka and D. Schildknecht [5], (much) later confirmed the gauge-independence of the $*$-scheme.

B. Improved Born Approximation: Standard Model high precision electroweak oblique quantum loops, for 4-fermion processes which are 1-gauge-boson reducible by cutting a massive $W^\pm$ a massive Z^0, or a massless photon

Let I_3 and Q be the initial weak isospin and electric charge, I'_3 and Q' the final. Let I_+ and I_- be the charge-raising and charge-lowering operators, respectively. [740] shows that (apart from certain non-trivial imaginary parts which we suppress for pedagogical reasons [740]) the neutral-current and charged-current matrix elements are:

$$\mathcal{M}^*_{NC}(q^2) \quad = \frac{e_*^2 Q Q'}{q^2[1 - iIm\Pi'^*_{AA}]} \tag{5}$$

$$
\begin{aligned}
&+\frac{e_*^2}{s_*^2 c_*^2}\frac{[I_3-(s_*^2)Q][I_3^{'}-(s_*^2)Q^{'}]}{q^2+\frac{e_*^2}{s_*^2c_*^2}\frac{1}{4\sqrt{2}G_\mu^*\rho^*}-is\Big(\frac{\Gamma_Z^*}{\sqrt{s}}\Big)}\\
\mathcal{M}_{CC}^*(q^2) \quad &= \frac{e_*^2}{2s_*^2}\frac{I_+I_-^{'}+I_-I_+^{'}}{q^2+\frac{e_*^2}{s_*^2c_*^2}\frac{1}{4\sqrt{2}G_\mu^*}-is\Big(\frac{\Gamma_W^*}{\sqrt{s}}\Big)}
\end{aligned}
$$

where the s-dependent Z total width [1] , and $W^{\pm}$ total width (Hollik105)

$$
\begin{aligned}
s\Big(\frac{\Gamma_Z^*}{\sqrt{s}}\Big) &= \frac{e_*^2}{s_*^2c_*^2}Im\big[\Pi_{33}-2s_*^2\Pi_{3Q}+q^2s_*^4\Pi_{QQ}^{'}\big]\\
s\Big(\frac{\Gamma_W^*}{\sqrt{s}}\Big) &= \frac{e_*^2}{s_*^2}Im\Pi_{+-} \qquad (6)
\end{aligned}
$$

are easily broken up into the various partial widths, and match the partial widths generated by the numerators in (5).

The effective neutral and charged current 1-loop **"improved Born approximation" [740]** 4-fermion matrix elements (2,3,5,8), (i.e. supplemented by certain non-trivial residual resummed 1-loop imaginary contributions [740]) obey the optical theorem for all 4-fermion t-channel processes, as well as for s-channel $|q^2|$ processes below the $t\bar{t}$, $t\bar{b}$, $b\bar{t}$, W^+W^-, ZZ, $W^{\pm}H$ and ZH mass thresholds.

$$
\begin{aligned}
2Im\Big[\mathcal{M}_{NC}^*\Big] &= \mathcal{M}_{NC}^{*\dagger}\mathcal{M}_{NC}^*\\
2Im\Big[\mathcal{M}_{CC}^*\Big] &= \mathcal{M}_{CC}^{*\dagger}\mathcal{M}_{CC}^* \qquad (7)
\end{aligned}
$$

That is, of course, as it should be, and first established [740] the correctness of the approximate Breit-Wigner $Z, W^{\pm}$ line-shapes, with s-dependent $Z, W^{\pm}$ widths. But (5)'s obedience of the optical theorem also ensures accurate neutrino counting on the Z peak, as well as the correct partial-width behavior there.

$$
\begin{aligned}
\mathcal{M}_{NC}^*(-M_Z^2) &= \frac{i[I_3-s_*^2Q][I_3^{'}-s_*^2Q^{'}]}{Im\big[\Pi_{33}-2s_*^2\Pi_{3Q}+q^2s_*^4\Pi_{QQ}^{'}\big]}\\
\sigma_{NC}^*(-M_Z^2) &\sim \frac{1}{M_Z^2}\frac{\Gamma_{InitialFermion}^*}{\Gamma_{Total}^*}\frac{\Gamma_{FinalFermion}^*}{\Gamma_{Total}^*}\\
\mathcal{M}_{CC}^*(-M_W^2) &= \frac{i}{2}\frac{I_+I_-^{'}+I_-I_+^{'}}{Im\Pi_{+-}} \qquad (8)
\end{aligned}
$$

The simple form of the improved Born approximation [740] (2,3,5,8) allows the Standard Model and its dominant oblique loops, together with certain Beyond the Standard Model (BSM) physics [740], to be fit to experimental data with ease, and also with clear and accurate interpretation and dissemiation of HP-EW-QL information to the wider physics community.

C. α, G_μ, M_Z renormalization scheme

We need to fix 3 experimentally measured [2] inputs

$$
\begin{aligned}
\frac{1}{e_*^2(q^2)} &= \frac{1}{e_*^2(0)} - \Delta_Q(q^2)\\
\frac{1}{4\sqrt{2}G_\mu^*(q^2)} &= \frac{1}{4\sqrt{2}G_\mu^*(0)} - \Delta_+(q^2)\\
M_Z^2 = M_{ZPole}^2 &= \frac{e_*^2(-M_Z^2)}{s_*^2(-M_Z^2)c_*^2(-M_Z^2)}\\
&\times\frac{1}{4\sqrt{2}G_\mu^*(-M_Z^2)\rho^*(-M_Z^2)} \qquad (9)
\end{aligned}
$$

and **calculate** the $SU(2)_{L-R}$ custodial isospin symmetry breaking function

$$
\begin{aligned}
\frac{1}{4\sqrt{2}G_\mu^*(q^2)\rho^*(q^2)} &= \frac{1}{4\sqrt{2}G_\mu^*(0)\rho^*(0)} - \Delta_3(q^2)\\
\frac{1}{\rho^*(0)} &= 1-4\sqrt{2}G_\mu^*(0)\Big[\Pi_{33}(0)-\Pi_{+-}(0)\Big] \qquad (10)
\end{aligned}
$$

while making use of certain auxiliary functions

$$
\begin{aligned}
\Delta_Q(q^2) &= Re\Big[\Pi_{QQ}^{'}+2\Gamma^{'}(\xi)\Big]_{q^2}\\
&-Re\Big[\Pi_{QQ}^{'}+2\Gamma^{'}(\xi)\Big]_{q^2=0}\\
\Delta_3 &= Re\Big[\Pi_{33}-q^2\Pi_{3Q}^{'}-2\Pi_{3Q}^{L}(\xi)\Big]_{q^2}
\end{aligned}
$$

---

[1] The total Z width Z, QCD correction for the light quarks ,with 69 calculated up to third order in s, except for the mb-dependent singlet terms, which are known to O(2s)70,71. For a review of the QCD cor- rections to the Z width, see 72. QCD corrections were first derived for the leading term of O(s G m2t) 73 and were subsequently completed by the O(s) correction to the log mt/MW term 74 and the residual terms of O(s) 75. Partial width electroweak 1-loop couplings 76 . These non-factorizable corrections sufficiently inclusive fi- nal states, i.e. for loose cuts to the invariant mass of the secondary fermions 77.

[2] Electro-weak renormalization schemes:

- On-shell scheme $sin^2(\theta_W) = s_W^2 = 1 - M_W^2/M_Z^2$, $\alpha_{QED}(0), G_\mu(0)$ [307, 386, 387, 422, 558, 612, 613, 792, 793, 804, 887, 963–965, 968**?** , 969]
- $\alpha_{QED}(0), G_\mu(0), M_Z$ scheme [4, 676, 740, 972]
- MSBar scheme 1922
- $sin^2(\theta_W) = 1 - M_W^2/M_Z^2$ with mixing angle deduced from neutrino-electron scattering 23
- Effective running couplings 24,25, [740].
- Scheme-dependence allows estimate of missing higher-order contributions (see e.g. 26 for a comprehensive study

$$
\begin{aligned}
&-Re\Big[\Pi_{33} - q^2\Pi_{3Q}^{'} - 2\Pi_{3Q}^{L}(\xi)\Big]_{q^2=0}\\
\Delta_{+} &= Re\Big[\Pi_{+-} - q^2\Pi_{3Q}^{'} - 2\Pi_{3Q}^{L}(\xi)\Big]_{q^2}\\
&-Re\Big[\Pi_{+-} - q^2\Pi_{3Q}^{'} - 2\Pi_{3Q}^{L}(\xi)\Big]_{q^2=0}
\end{aligned}
\tag{11}
$$

The α, G_μ, M_Z renormalization scheme specifies experimental input data from atomic Thomson scattering, the muon lifetime [3] and the precise Z mass:

$$
\begin{aligned}
\frac{e_*^2(0)}{4\pi} &= \alpha_{QED}(0) = (137.03602)^{-1}\\
G_\mu^*(0) &= G_\mu + CertainGaugeIndependent\\
&\quad Vertices, Boxes, Radiation\\
G_\mu &= 1.16637 \times 10^{-5} GeV^{-2}\\
M_Z &= 91.1876 \pm 0.0021 GeV
\end{aligned}
\tag{12}
$$

D. High precision OBLIQUE electro-weak quantum loop experimental predictions

HP-EW-QL LEP/SLC asymmetry experiments are predicted by

$$
s_*^2(-M_Z^2)c_*^2(-M_Z^2) = \frac{e_*^2(-M_Z^2)}{4\sqrt{2}G_\mu^*(-M_Z^2)\rho^*(-M_Z^2)M_Z^2}
\tag{13}
$$

Running $e_*^2(q^2), s_*^2(q^2), G_\mu^*(q^2)$ and $\rho^*(q^2)$ down, from $q^2 = -M_Z^2$, to $q^2 = -M_W^2$ predicts the $W^\pm$ mass.

$$
M_W^2 = \frac{e_*^2(-M_W^2)}{s_*^2(-M_W^2)c_*^2(-M_W^2)4\sqrt{2}G_\mu^*(-M_W^2)}
\tag{14}
$$

Running $s_*^2(q^2)$ down further to low space-like values predicts (including quark and lepton thresholds) ν-hadron scattering and parity violation in atoms.

$$
\begin{aligned}
s_*^2(0)c_*^2(0) &= \Big[\frac{s_*^2(0)c_*^2(0)}{s_*^2(-M_Z^2)c_*^2(-M_Z^2)}\Big]\\
&\quad \times s_*^2(-M_Z^2)c_*^2(-M_Z^2)
\end{aligned}
\tag{15}
$$

Note that the **running** of $e_*^2(q^2), s_*^2(q^2)$ does not depend on m_{BEH}, and only mildly on m_{top}. Running $s_*^2(q^2)$ for time-like and spacelike regions was first shown, for $M_Z, m_{top} = 93, 40$ GeV, in Figure 12 of [740].

E. Hadronic uncertainty for 4-lepton processes

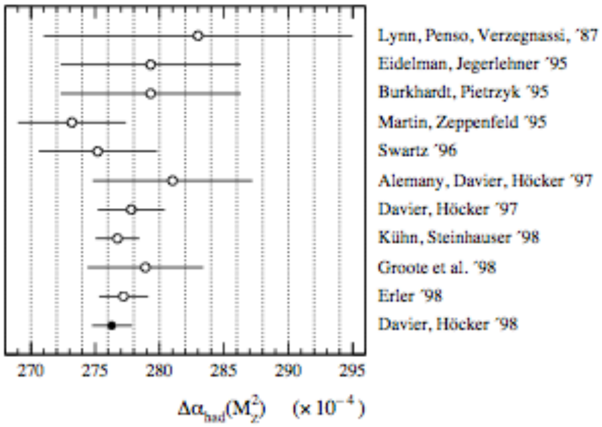

FIG. 1

Hadronic vacuum polarization dispersion relation value 29,30 agrees with another independent analysis 31. Improve uncertainty with τ-decays 32. Recently other attempts have been made to increase the precision of $\alpha_*(M_Z^2)$ 33,35,36,37 by theory-driven analyses of the dispersion integral based on perturbative QCD. Quark-mass-dependent $\mathcal{O}(\alpha_{QCD}^2)$ QCD corrections 38 near b and c thresholds (39 in the massless approximation). Minimize error from less reliable regions 36 and 33: e.g. by rescaling open charm regions 35. Separate $\alpha_*(M_Z^2)$ in un-subracted $\bar{M}S$ in 37 gives comparable error. Ref 34 gives history of dispersion relation starts by quoting Lynn, A. Penso, Verzegnassi 1987. Higher-dimensional operators in the operator product expansion 40 probe nonperturbative contributions, showing they are negligibly small 33,34. Recent preliminary measurements of R at BES at 2.6 and 3.3 GeV show values slightly lower than the previous data 41,2. Value $\Delta\alpha_{hadronic} = 0.0280 \pm 0.0007$ independent of theoretical assumptions on QCD at lower energies and thus less sensitive to potential systematic effects not under consideration now 42.

III. STANDARD MODEL HIGH-PRECISION PREDICTIONS

B.W.Lynn and R.G.Stuart [670, 682] successfully predicted both the precise top-quark and Brout-Englert-Higgs (BEH) masses, m_{top} and m_{BEH} respectively, from High-Precision Electro-Weak Quantum-Loops (HP-EW-QL) on Z-pole in 1984, with their prediction to be compared to future

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[3] Fermi coupling constant G_μ. Originally, the μ-lifetime τ_μ has been calculated within the framework of the effective 4-point Fermi interaction. Beyond the well-known 1-loop QED corrections 51, the 2-loop QED corrections in the Fermi model have been calculated quite recently 52

LEP/SLD Z-pole data [4] .

Inversely, when m_{top} and m_{BEH} are input into HP-EW-QL theory, LEP, SLD, CDF, D0 and NuTev experiments vindicate the re-summed 1-loop and 2-loop quantum structure of the Standard Model [155]. [5]

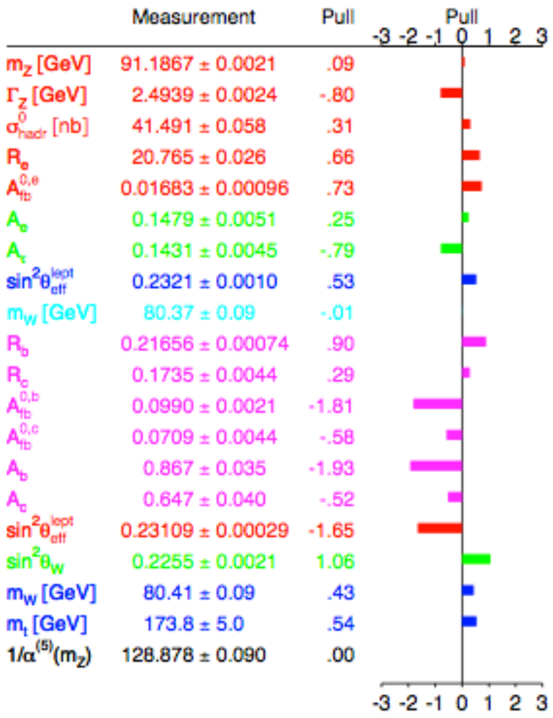

FIG. 2

A. Theory fundamentals

1. Invention of symbolic manipulation programming (in 1965 on punch cards!), expressly for HP-EW-QL, by M.J.G. Veltman [568, 569]
2. Renormalizability and unitarity in the Standard Model [179, 548–553, 618].
3. Theory fundamentals for practical calculations in the Standard Model [554–557, 564]
4. Translation of subtle theory to experimental possibilities [558**?**], [625, 670, 682]
5. Constraints on BEH mass from vacuum stability, absence of Landau pole, and lattice gauge theory [90–104, 404]
6. Avoidance of unphysical negative quartic couplings from the negative top quark contribution to its beta function [95–99]

B. Vertices, boxes, higher orders

There is therefore no real need here to “pinch”, or worry about, the 1-loop gauge-dependence of vertex and box diagrams: ‘$*$-scheme’ Γ' and Π^L_{3Q} counterterms will cancel that separately.

1. 1998 report of the Particle Data Group 53, MW , MZ of the vector bosons, expressed in terms of and G; in 1-loop order it is given by9: r higher than 1-loop (see also the con- tribution by Kühn 54 to these proceedings leading log resummation55 of
2. resummation of the leading m2t contribu- tion 56 in terms of the complete O(s) corrections to the self energies are avail- able 57,58. Non-leading QCD correc- tions to r are also available 59. non-leading higher-order terms containing mass singular- ities of the type 2 log(MZ /mf) from light fermions are incorporated 60 .
3. subleading G2m2t MZ2 contribution of the electroweak 2-loop order 61
4. Meanwhile exact results have been derived for the Higgs-dependence of the fermionic 2-loop corrections in r 62, and comparisons were performed with those ob- tained via the top mass expansion 63 . Pure fermion-loop contributions (n fermion loops at n-loop order) have also been investigated63,64.

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[4] Certain of [682]’s (α_{QED}, G_μ, M_Z renormalization scheme) Z-pole results were mutually directly confirmed with M. Veltman (for G. Passarino), W. Hollik and M. Consoli [558, 625, 968]: unfortunately, because they used the on-shell renormalization scheme for the weak mixing angle $s_W^2 = 1-\frac{M_W^2}{M_Z^2}$, those authors were unable to (and do not) suggest or display the extreme HP-EW-QL sensitivity to m_{top} and m_{BEH} on Z-pole, which later contributed most directly to those particles’ experimental discovery.

[5] Note that the experimental value for l points at the presence of genuine electroweak corrections by 3.5 stan- dard deviations, an observa- tion that has been persisting already for several years 83. The inclusion of the two-loop electroweak corrections m2t from 61 yields a sizeable positive contribution to s2l , see Figure 4. The inclusion of this term hence strength- ens the upper bound on MH . The inclusion of the two-loop electroweak corrections m2t from 61 yields a sizeable positive contribution to s2l , see Figure 4. The inclusion of this term hence strength- ens the upper bound on MH.

5. Effective Z boson couplings: 1-loop diagrams without virtual pho- tons, the non-QED or weak corrections. written in terms of fermion-dependent overall normalizations f and effective mixing angles s2f in the NC vertices (see e.g.65 G2m2t MZ2 for the leptonic mixing angle 61 s2l have also been obtained in the meantime, as well as for l 66.
6. difference between the d and b couplings calculated perturbatively, including the complete 1-loop order term 67 leading electroweak 2-loop contribution of O(G2 m4t) 46,68

C. Electromagnetism and bremmstrahlung

1. Electro-magnetic $\alpha_{leptonic}$: The 2-loop correction 27, and also the 3-loop contribution is now available 28.
2. The radiator function H(k) with soft-photon resummation and the exact O(2) re- sult for initial-state QED corrections is given in ref 78 . It has been improved recently by the O(3) term79.
3. Bhabha scattering in the forward direction=luminosity, higher-order QED corrections 80. BHLUMI are an important step in pinning down the theoretical error from 0.11

D. Fitting theory to experiment

1. Computational integration of theoretical knowledge [672]
2. Electroweak precision data on Z and W bosons [1, 2] and $p\bar{p}$ collider Tevatron [2, 936**?** **?** –940]
3. Discovery of the top quark at Tevatron [941**?**]. 1998 mass measurement [3]
4. The leptonic mixing angle determined via ALR by the SLD experiment 82 and the s2l average from LEP, still differ by 2.8 standard deviations.
5. W mass prediction 80.372, experiment 80.39 0.06
6. Standard model global fits: The FORTRAN codes ZFITTER87 and TOPAZ088 (both used in Figure **??** , good agreement between the predictions from the two independent programs 89.
7. The 1998 upper limit to the Higgs mass at the 95
8. Another recent analysis90 (for earlier studies see91,92) based on the data set of summer 1998 yields a Higgs mass MH = 107+67 45 GeV indirect determination of the Higgs mass range has shown that the Higgs is light, with its mass well below the non-perturbative regime.
9. For LEP 2, an W 93 error of about 40 MeV in MW can be reached .
10. The present lower limit (95

E. Other processes

1. History of theoretical physics: this paper and [354, 358]
2. s2W the ratio MW /MZ can in- directly be measured in deep-inelastic neutrinonucleon scattering. The average from the experiments CCFR, CDHS and CHARM 85 with the recent NUTEV result 86
3. Parity violations in atoms by B.W. Lynn, and independently W.J. Marciano and A. Sirlin, in 1982 [418, 726, 727, 747, 765], later confirmed experimentally [**?**].
4. Production and decay of W bosons [72–88, 403, 825–827, 896, 897]
5. BEH decays $H \to W^+W^-$, $H \to ZZ$, $H \to f\bar{f}$ [105–109, 980–986]
6. The decay $B \to X_s\gamma$ [110–122, 723]
7. Muon anomalous magnetic moment [12, 13, 25, 48, 123, 130–136, 399, 573–577, 724, 725, 877]. Theoretical uncertainties from virtual hadrons: the dominant error is from vacuum polarization; that involving light-by-light scattering has now been established with acceptable uncertainty.

IV. SUCCESSFUL PREDICTION OF THE TOP QUARK MASS FROM LEP/SLD DATA

B.W. Lynn and R.G. Stuart's successful 1984 Z-pole physics 1-loop HP-EW-QL prediction for the top-quark mass [670, 682] fit to EXPOSTAR [671–674] led to its discovery, and contributed directly to the award of the 1999 Nobel Prize in Physics for the renormalizability and unitarity of spontaneously broken Yang Mills gauge theories [367];

A. EXPOSTAR HP-EW-QL prediction for the top quark mass, based on ALEPH rapidity, confirmed by experimental discovery at FNAL

The 1991/1992 published literature's HP-EW-QL predictions for the top-quark mass were:

- To quote from P. Langacker and Mingxing Luo, "Implications of precision electroweak experiments for $m_t, \rho_0, sin^2(\theta_W)$ and grand unification" [1008]: "The implications of precision Z-pole, W-mass, and weak-neutral-current data for $SU(2) \times U(1)$ models are described. Within the minimal model one finds ... the top-quark mass is predicted to be $m_{top}^{1991WorldAverage1} = 124^{+28+20}_{-34-15} GeV$, where the second uncertainty is from m_H, with $m_t < 174(182) GeV$ at 90(95)% C.L."

- They were supported by [363] which fit Z-pole, FNAL top-quark non-discovery, ν-hadron collisions, M_W, M_Z and parity violations in atoms data with $m_{top}^{WorldAverage2} = 122^{+25}_{-20} GeV$ and $m_{BEH}^{WorldAverage2} = 65^{+245}_{-4} GeV$

- The LEP 1991 data combined fit, in G. Alexander et al., the LEP Collaborations ALEPH, DELPHI, L3 and OPAL, "Electroweak Parameters of the Z^0 Resonance and the Standard Model" [174]., combined the 4 LEP experiments' separate fits to ≈650,000 Z^0 decays to hadrons and charged leptons in 1989/1990 LEP1 data; Results: $m_{top;\alpha_{QCD} Unconstrained}^{LEP1991} = 94^{+53+23}_{-\ldots-24} GeV$, and $m_{top;\alpha_{QCD} Constrained}^{LEP1991} = 124^{+40+21}_{-56-21} GeV$ when α_{QCD} was contrained to $\alpha_{QCD} = 0.118 \pm 0.008$ [362].

Meanwhile, in a completely separate HP-EW-QL effort, EXPOSTAR [671–674] was written to contain: all LEP1 and SLC 4-fermion processes (especially on/near Z pole), including Bhabha scattering; complete 1-loop vertex and box corrections; dispersion relation inclusion of light-hadron contributions to vector self-energies; all-orders resummed 1-loop oblique [740]; certain 2-loop electroweak; photon radiation including hard and resummed/exponentiated soft/co-linear photon emmision; leading 2-loop $\mathcal{O}(\alpha_{QCD} m_{top}^2)$; minimal use of Monte-Carlos for hard wide-angle hard photons and box diagrams; appropriate perturbative α_{QCD} corrections for final-state heavy quarks and total hadrons.

Using EXPOSTAR, "On estimating the top quark mass from global analyses of e^+e^- collision data" [672] first identified two previously unknown ALEPH, DELPHI, L3, OPAL, and SLD Monte-Carlo-based systematic analysis errors: background rejection (Figure 3 in [672]); and efficiency vs. inverse-purity (Figure 2 in [672]). These we repaired by cutting particle-production data in rapidity (i.e. rather than acolinearity) and working in the e^+e^- collison frame.

As a bonus, the resulting almost-Monte-Carlo-free speed-up factor of ≈50,000-250,000 allowed [673, 674] to fit M_Z, m_{top}, m_{BEH} directly to ALEPH data, without reference to baroque definitions of non-physical running $s_*^2(q^2), \bar{s}^2(q^2), s_{\bar{M}S}^2(q^2)$ or other (e.g. $e_*^2(q^2), G_\mu^*(q^2), \rho^*(q^2), s_W^2 = 1 - \frac{M_W^2}{M_Z^2}$, etc.) intermediate quantities.

After [673] fit 1990 ALEPH-LEP1 data with EXPOSTAR [671], D. Levinthal and F. Bird (with B.W. Lynn and R.G. Stuart) [674], "Fits of 1990/1991 (ALEPH) Data with EXPOSTAR, including non-Standard Model Extensions" followed with significantly more ALEPH data.

In stark contrast to the world-physics-community consensus $m_{top} \approx 124 GeV$ [174, 363, 1008], our rapidity-cut EXPOSTAR fits of the 1990/1991 ALEPH data (directly to $M_Z, m_{top}, m_{BEH}, \alpha_{QCD}$) raised the top-quark mass dramatically to $m_{top;\alpha_{QCD} Unconstrained}^{RapidityALEPH} = 206^{+31}_{-37} GeV$. When α_{QCD} was contrained to the then-ALEPH value $\alpha_{QCD}^{ALEPH1991} = 0.125 \pm 0.005$, our $m_{top;\alpha_{QCD} Constrained}^{RapidityALEPH} = 181^{+29}_{-34} GeV$ was ∼60 GeV over the then-ALEPH acollinearity-fit value [675] for the same data set: i.e. much closer to the top-quark's 1995 experimental discovery-mass and since-improved mass measurements.

B. Successful prediction for the Top Quark Mass, based on LEP rapidity

The ALEPH (M. Martinez, J. Harton, A. Blondel et. al. [364]) and ZFITTER collaborations compared EXPOSTAR and ZFITTER to check/confirm 1-loop correctness in the early days of ZFITTER [357, 817]. The other 4 LEP/SLC experiments and ZFITTER [817] later also adopted our rapidity/collision frame analysis and speed-up factor.

In 1993, ALEPH [365, 671] predicted (the 2nd errors in [365, 366] are from m_{BEH}) $m_{top}^{ALEPH1993} = 156^{+22+17}_{-25-22}$ from ≈520,000 ALEPH 1989-1992 Z-decays, ν-hadron collisions, and $\frac{M_W}{M_Z}$ in $p\bar{p}$ collisions.

In 1994, M. Martinez [366, 671, 817] predicted $m_{top}^{LEP1993} = 173^{+12+18}_{-13-20}$ from ≈2,000,000 Z-decays in 1989-1993 LEP data,

The top-quark was discovered, close to D. Levinthal, F.Bird, B.W. Lynn and R.G. Stuart's

1992 [671–674], ALEPH's 1993 [365, 671], and M. Martinez's 1994 [366, 671, 672, 817] predicted masses, in 1995 at FNAL (CDF, D0) with (eventually) $m_{top}^{Experiment} = 172.44 \pm 0.13 \pm 0.47 GeV$.

V. BROUT-ENGLERT-HIGGS MASS

Once the top-quark mass was known, i.e. after its discovery in 1995, the Standard Model HP-EW-QL could be used [670, 682, 858] to predict the SM Brout-Englert-Higgs [168–173] mass.

A. 2011 Prediction of the BEH mass

The LEP, SLC and CLEO HP-EW-QL fits, and FNAL top-quark discovery and BEH scalar search data, as of July 2011, are displayed in Figure 3 [357].

- The blue contour shows the 2-loop HP-EW-QL Z-pole and Nutev physics m_{BEH} prediction: (1-loop [670, 682] augmented by certain 2-loop [155, 858]) fit to data from LEP (ALEPH, DELPHI, L3, OPAL), SLC(SLD) and CLEO(Nutev), with SM theory from ZFITTER [356–358, 793, 817–819] and TOPAZ0 [**?**],
- The green belt is the top-quark mass from FNAL (CDF, D0)
- The yellow regions are excluded by LEP2 (ALEPH, DELPHI, L3, OPAL) and FNAL(CDF, D0) searches.

Putting this all together yields the 2-loop HP-EW-QL Z-pole-physics m_{BEH} prediction [670, 682, 858] fit to data from LEP, FNAL and NuTev, with ZFITTER and TOPAZ0 SM theory [356–358, 793, 817**?** –819] in Figure 4.

The successful July 2011 prediction in Figure 4 led directly to the July 4, 2012 discovery of the BEH scalar at the LHC, at (eventually) $m_{BEH} = 125.09 \pm 0.24 GeV$: it was confirmed as the Standard Model BEH on 14 March 2013. The HP-EW-QL prediction in Figure 4 contributed to the award of the 2013 Nobel Prize in Physics [368] to F. Englert and P. Higgs.

D. Bardin, M. Bilenky, P. Khristova, M. Jack, L. Kalinovskaya, A. Olshevsky, S. Riemann and T. Riemann, were later honored as First Scientific Award of JINR, Dubna, 19 January 2001, refereed by Lev Borisovich Okun [819].

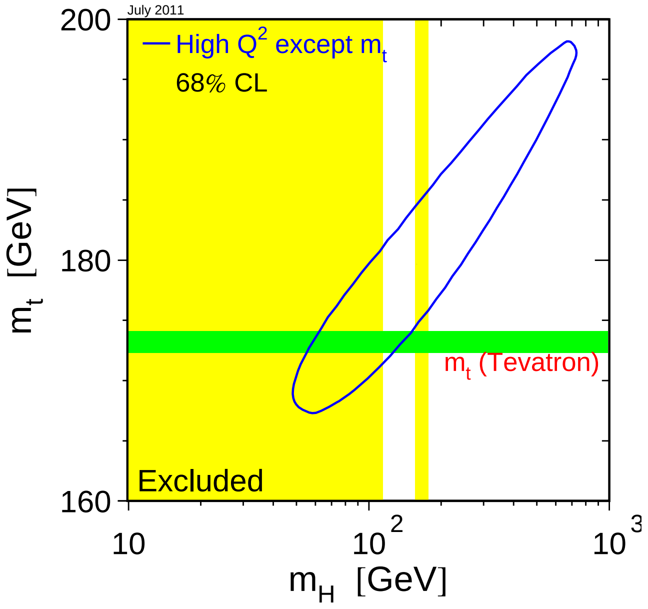

FIG. 3

B. ATLAS and CMS BEH scalar discovery papers' reference bibliographies

J.D. Wells, "The theoretical physics ecosystem behind the discovery of the Higgs boson" [358], gives a nice review of a part of the physics used by (and explicitly referenced by) ATLAS and CMS, to analyse their vast data. Define **LHC's background-data region** as the area to the right-hand-side of Figure 4, extended from $m_{BEH} \sim 200 GeV$ to $m_{BEH} \sim 1 TeV$: i.e. mostly focussed on "Beyond the Standard Model" theorist-imagined heavy BEH-like scalars' production and decay channels, of which LHC has (so far) demonstrated experimentally that Nature makes no use. Its complement, **LHC's discovery-data region**, between $m_{BEH} \sim 114 GeV$ and $m_{BEH} \sim 200 GeV$ includes the white regions. But the Standard Model HP-EW-QL m_{BEH} prediction [357, 670, 682, 817, 858] (parabolic lines) was shown (to 99% C.L.) to lie in the discovery-data region soon after the 1995 experimental discovery of the top-quark, i.e. at least a decade before the 2010 turn-on of the LHC.

It is therefore astonishing to read Wells' incorrect assertion: "What made the discussion regarding the (SM) Higgs boson particularly difficult is that its mass was not known a priori ... One had to be prepared for all possibilities of the (Brout-Englert) Higgs boson mass all the way from

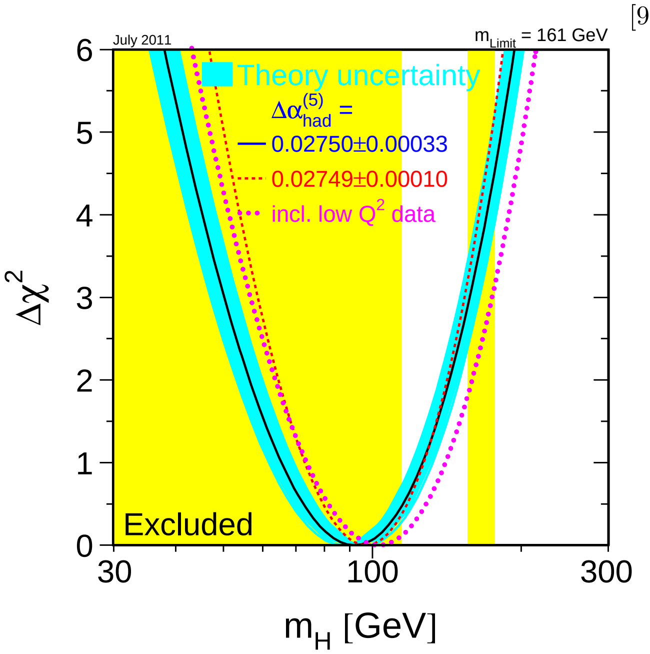

FIG. 4

$M_{BEH} \sim m_{electron}$ to $M_{BEH} \approx 1TeV$". In exact disagreement, Figures 3 and 4 show that $114GeV \leq M_{BEH} \leq 161GeV$ to high C.L.!

In-explicably, Wells' "ecosystem", and the ATLAS and CMS theory references he studies, do not contain a single reference to the huge exhaustively-documented ∼15,000 man-year (pre-LHC-design) effort (ALEPH, DELPHI, L3, OPAL, SLD, CDF, D0, NuTev experiments; and an army of HP-EW-QL theorists in the bibliography below) made to (successfully!) predict the Standard Model BEH mass from HP-EW-QL.

C. Implications for CDF, D0 and the Tevatron

Wolfgang Hollik [155] presents a comprehensive summary and detailed explanation of state-of-the-art theoretical Standard Model HP-EW-QL as of December 1998. Hollik and his references (included within the exhaustive bibliography below) make the case (already airtight and fully globally socialized before The 1998 International Conference on Hight Energy Physics (ICHEP1998) [155]) for the accuracy and reliability of the theoretical Standard Model HP-EW-QL prediction of the BEH mass; i.e. that precise SM prediction later confirmed by the 2012 experimental discovery.

All of this shows that the BEH scalar could have been discovered at the Tevatron by Summer 2006. [944].

- LEP2 BEH scalar Higgs exclusion searches (Figure ??, 1998) show $M_{BEH} > 114GeV$
- CDF and D0 BEH scalar Higgs exclusion searches (Figure ??, 2006) $M_{BEH} \neq 149$ to 180 GeV [942];
- To high C.L., the HP-EW-QL prediction (i.e. by naively chopping off the LEP and FNAL BEH-exclusion regions) is $114GeV < M_{BEH} < 149GeV$.
- But, to quote J. Wells [358], "... the richest and most complicated mass range of $120GeV \leq M_{BEH} \leq 160GeV$ ... enabled competing branching fractions of the decays of the Higgs bosons into many states, such as b quarks [361], leptons, WW^* and ZZ^* ... (which) means that no one final state is necessarily the dominant signal of the Higgs boson ... the initial Higgs boson discovery (at LHC) was ultimately made by two channels, $H \rightarrow \gamma\gamma$ and $H \rightarrow ZZ^* \rightarrow (e^+e^-e^+e^-, e^+e^-\mu^+\mu^-, \mu^+\mu^-\mu^+\mu^-)$".

Figures ?? and ?? also show that the BEH could have been studied and, in time, confirmed as the Standard Model BEH, at the Tevatron.

- Multiple final states in the $114GeV \leq M_{BEH} \leq 161GeV$ region predicted by HP-EW-QL "... also provides in time a variety of Higgs study opportunities, since the nature of the Higgs boson can be discerned better by having many accessible decay channels rather than just one or two [358]."

One cannot help but wonder whether $\big[$that is, in an alternate landscape universe where proposed CDF and D0 detector upgrades (e.g. vertex detectors, etc. [944]) as well as any necessary Tevatron upgrades, were approved at FNAL after the discovery of the top-quark$\big]$ the Standard Model BEH scalar would have been discovered, studied and confirmed a decade before the LHC did so.

VI. HP-EW-QL $W^{\pm}$ MASS

A. Sirlin's precise 1980 1-loop prediction for the $W^{\pm}$ mass [175, 386, 625, 670, 682], augmented by certain 2-loop contributions [858], contributed directly to the successful HP-EW-QL predictions of the top-quark and BEH masses, and the associated 1999 and 2013 Nobel Prizes [367, 368].

VII. NON-DECOUPLING OF VERY HEAVY “BEYOND THE STANDARD MODEL” (BSM) MATTER

The classification [178, 354, 676, 740, 746] of hypothesized BSM contributions to oblique HP-EW-QL has experimentally ruled out vast swaths of imagined BSM physics. Recent experimental exclusion of such BSM physics at CERN’s Large Hadron Collider has confirmed these theoretical predictions.

B.W. Lynn, M.E. Peskin and R.G. Stuart [178, 676, 746] first dentified and named “oblique” loop corrections; first showed the extreme LEP1/SLC sensitivity to 1-loop non-decoupling effects of very heavy BSM particles (i.e. $SU(8) \times SU(8)$ and $O(16)$ Technicolor, heavy quarks and leptons, N=1 SUSY squarks and sleptons, N=1 SUGRA gauginos and Higgsinos, etc.); first proposed that such high precision indirect sensitivity be part of the practical and official discovery strategies of LEP1 and SLC. Table 1 is reproduced from [676]: its last 2 rows show achieved uncertainties.

There are 3 dimensionless oblique gauge-independent HP-EW-QL objects from which very heavy particles do not necessarily de-couple:

$$\begin{aligned} \Delta_3'(q^2) = \frac{\Delta_3}{q^2}; \quad \Delta_+'(q^2) = \frac{\Delta_+}{q^2}; \\ \rho^*(0) = \rho_{Veltman}; \end{aligned} \tag{16}$$

The 1st and 2nd functions were introduced in July 1987 [740]. The 3rd, the parameter $\rho^*(0)$, is equal to M. Einhorn, D.R.T. Jones and M.J.G. Veltman, and separately M.J.G. Veltman and D. Ross’s, famous custodial symmetry breaking $\rho_{Veltman}$ parameter. [6]

Three “non-de-coupling” parameters were introduced [740] to capture the effects of very heavy $M^2 \gg M_Z^2$ new BSM fermions, split scalars and Technicolor theories:

$$\begin{aligned} \Delta_3'(-M_Z^2) = \left[\frac{\Delta_3}{q^2}\right]_{-M_Z^2}; \quad \Delta_+'(-M_Z^2) = \left[\frac{\Delta_+}{q^2}\right]_{-M_Z^2} \\ \rho^*(0) = \rho_{Veltman}; \end{aligned} \tag{17}$$

and were common knowlege at 1987, 1988, 1989 and 1990 LEP workshops, seminars and international conferences [**?**].

For example, [740] [Eq. 6.7] first showed the constant 1-oblique-loop contribution to modern S, which would be due to a very heavy non-decoupling BSM fermion multiplet (e.g. a 4th generation of quarks and leptons, gauginos, Higgsinos) of isospin weight i :

$$\Delta_3'(-M_Z^2) = \frac{i(i+1)(2i+1)N_{colors}}{144\pi^2} \tag{18}$$

LEP/SLC therefore rules out [7] a 6th quark/lepton generation with degerate masses.

Technicolor theories with N_{TC} Techni-Color and N_{TF} Techni-Flavor fermions embed the 3 Nambu-Goldstone bosons (NGB) (i.e. resulting from $SU(2)_L \times U(1)_Y \to U(1)_{QED}$ symmetry breaking) within a Techni-Multiplet of pseudo-NGB pseudo-scalars with low-momentum non-linear sigma model interactions. Beginning in 1990, in order to prove the non-trivial gauge-independence (and non-decoupling) of such theories, using a dispersion relation appropriate to the resulting tower of Techni-Hadrons, later versions of [740]’s oblique-loop classification scheme were introduced [369–372, 785, 901, 923]. Pierre Ramond ([354] pg. 206 and Appendix 5) shows their 1-to-1 correspondence with [740]’s oblique- correction classification scheme of heavy non-decoupling BSM physics.

$$\begin{aligned} \Delta_3'(0) &\equiv -\frac{1}{16\pi} S \\ \Delta_+'(0) - \Delta_3'(0) &\equiv \frac{1}{16\pi} U \\ \frac{1}{\rho_{Veltman}} &\equiv 1 - \alpha_{QED}(0) T \end{aligned} \tag{19}$$

Using their gauge-independent Techi-Hadron dispersion relation, [369] gets Technicolor S

$$S \approx 0.3 \frac{N_{TF}}{2} \frac{N_{TC}}{3} \tag{20}$$

and Extended-Technicolor (which attempted to predict quark and lepton masses) models’ T with $N_{Colors} = 3$

$$T \approx \frac{N_{Colors} m_{top}^2}{16\pi^2 s_*^2(0) c_*^2(0) M_Z^2} \frac{4 N_{TC}}{9} \tag{21}$$

Then, using then-available HP-EW-QL data, [369] ruled out QCD-like Technicolor theories with a large Technisector.

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[6] ρ-parameter, originally defined as the ratio of the neutral to the charged current strength in neutrino scattering 43, is unity in the standard model at the tree level, but gets a deviation $\Delta\rho$ from 1 by radiative corrections. 43; $\frac{1}{\rho_*(q^2)} = 1 - \Delta\rho(q^2)$ [740] in oblique-loop re-summation. Main contribution is from (t, b) doublet 44 ; electroweak 2-loop part 45,46. $\delta\rho_{QCD}$ is the QCD correction to the leading $G_\mu m_{top}^2$ term 47,48; 3-loop coefficient 48 For large Higgs masses $1 - loop \sim \log M_H$ 49; the 2-loop contribution 50 shows a dependence $2 - loop \sim M_H^2$

[7] Experimental non-existence of such BSM physics was 1st shown in a 1991 fit to ALEPH Z-pole data [673, 674].

Table 1: Oblique 1-Loop Responses of Various LEP/SLC Asymmetries and the $W^{\pm}$ Mass

	$\delta A_{LR}^{e^+e^-\to\mu^+\mu^-} = \delta A_{\tau Polarization}^{e^+e^-\to\tau^+\tau^-}$ $=\delta A_{LR}^{e^+e^-\to Hadrons}$	$\delta A_{FB}^{e^+e^-\to\mu^+\mu^-}$ $= \delta A_{FB}^{e^+e^-\to\tau^+\tau^-}$	$\delta M_W(MeV)$
STANDARD MODEL			
Heavy Quark Pair			
Large $\vec{I}$ Splitting	0.02	0.01	300
Degenerate	−0.004	−0.002	−42
Heavy Lepton Pair			
Large $\vec{I}$ Splitting	0.012	0.006	300
Degenerate	−0.0013	−0.0006	−14
N=1 SUSY SM			
Heavy Squark Pair			
Large $\vec{I}$ Splitting	0.02	0.01	300
Degenerate	0	0	0
Heavy Slepton Pair			
Large $\vec{I}$ Splitting	0.012	0.006	300
Degenerate	0	0	0
N=1 SUGRA SM			
Winos			
$m_{3/2} \ll 100GeV$	0.005	0.0025	100
$m_{3/2} \gg 100GeV$	< 0.001	< 0.001	< 10
TECHNICOLOR			
(No Dispersion Relation)			
$SU(8) \times SU(8)$	−0.04	−0.018	−500
$O(16)$	−0.07	−0.032	−500
UNCERTAINTY			
Hadronic Theoretical	±0.0033	±0.0016	±25
Experimental	±0.0033	±0.0016	±40

Later 1992 analysis of HP-EW-QL 1990/1991 LEP data ruled out all then-existing Technicolor and Extended-Technicolor models.

VIII. HP-EW-QL STANDARD MODEL VINDICATED: RUNNING $s_*^2(q^2)$

Appendix A: Guide to the Bibliography

The High Precision Electro-Weak Quantum Loop literature is immense! For example, a SLAC INSPIRE query of the HP-EW-QL literature, for Date $\leq$ 1988, reveals a list of 338 theoretical physicists [177] then working in the field. The bibliography below is meant to be exhaustive for Date $\leq$ 1998, as per SLAC INSPIRE, Cornell arXiv and W. Hollik [155]. We apologize if we have in-advertently left anyone out.

In addition, we have included all references in [155], i.e. included in W. Hollik's wonderful detailed and explanatory Plenary Session review and summary (as of December 1998) of the state of HP-EW-QL at the 1998 International Conference on High Energy (ICHEP98). After eliminating double-

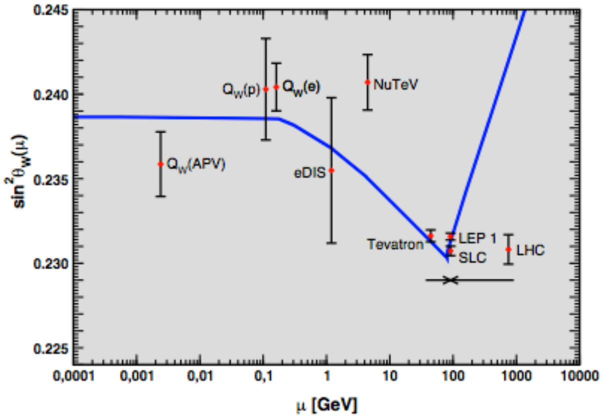

FIG. 5

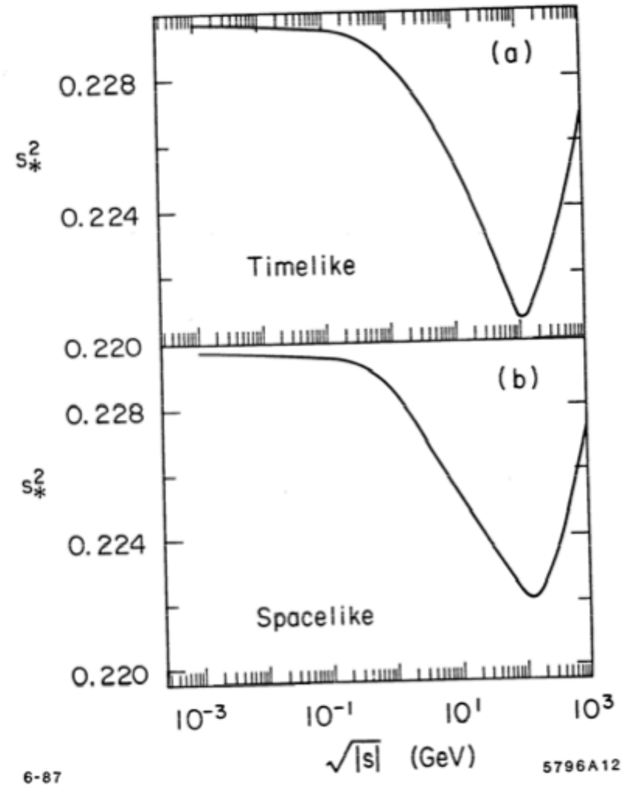

FIG. 6

counting, we generate 989 references by the end of 1998.

We have also included selected papers, books, experimental results, experimental analysis and Nobel citations for 1999 ≤ Date ≤ present.

For Date ≤ 1988, HP-EW-QL was a thriving scientific and mathematical mainstream and target of discovery, but its important theoretical Standard Model ideas and basics, along with (most of) their practical implementation and execution were already completed by the end of 1988.

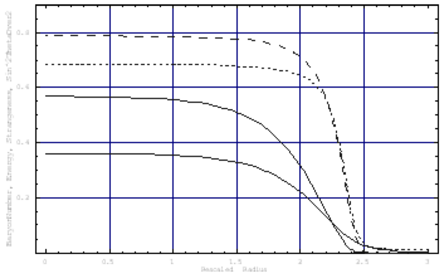

FIG. 7: Standard Model HP-EW-QL 1-loop [670, 682] and 2-loop [858] oblique diagrams containing a virtual top-quark

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[1] (Hollik 1.) The LEP Collaborations ALEPH, DELPHI, L3, OPAL, the LEP Electroweak Working Group and the SLD Heavy Flavor Working Group, CERN- PPE/97-154 (1997); M. Grunewald, talk at ICHEP98

[2] (Hollik 2.) D. Karlen, plenary talk at ICHEP98

[3] (Hollik 5.) R. Partridge, plenary talk at ICHEP98

[4] (Hollik 18.) V.A. Novikov, L.B. Okun, M.I. Vysotsky, Nucl. Phys. B 397, 35 (1993)

[5] (Hollik 25.) M. Kuroda, G. Moultaka, D. Schildknecht, Nucl. Phys. B 350, 25 (1991)

[6] (Hollik 27.) G. Kallen, A. Sabry, K. Dan. Vidensk. Selsk. Mat.- Fys. Medd. 29 (1955) No. 17

[7] (Hollik 28.) M. Steinhauser, Phys. Lett. B 429, 158 (1998)

[8] (Hollik 30.) H. Burkhardt, B. Pietrzyk, Phys. Lett. B 356, 398 (1995)

[9] (Hollik 31.) M.L. Swartz, Phys. Rev. D 53, 5268 (1996)

[10] (Hollik 32). R. Alemany, M. Davier, A. Ho cker, Eur. Phys. J. C 2 (1998) 123

[11] (Hollik 33.) M. Davier, A. Hocker, Phys. Lett. B 419, 419 (1998); hep-ph/9801361

[12] (Hollik 33.) M. Davier, A. Hocker, hep-ph/9805470 (1998)

[13] (Hollik 34.) A. Hocker, talk at ICHEP98 (PS1), these proceed- ings

[14] (Hollik 36.) S. Groote, J. K orner, K. Schilcher, N.F. Nasrallah, hep-ph/9802374

[15] (Hollik 37.) J. Erler, hep-ph/9803453

[16] (Hollik 38.) A.H. Hoang, J.H. Kühn, T. Teubner, Nucl. Phys. B 452, 173 (1995);

[17] (Hollik 39.) A.D. Martin, D. Zeppenfeld, Phys. Lett. B 345, 558 (1995)

[18] (Hollik 40.) E. Braaten, S. Narison, A. Pich, Nucl. Phys. B 373 (1992) 581

[19] (Hollik 41.) Z. Zhan, talk at ICHEP98, 16

[20] (Hollik 44.) M.S. Chanowitz, M.A. Furman, I. Hinchliffe, Phys. Lett. B 78, 285 (1978)

[21] (Hollik 45.) J.J. van der Bij, F. Hoogeveen, Nucl. Phys. B 283, 477 (1987)

[22] (Hollik 48.) L. Avdeev, J. Fleischer, S. M. Mikhailov, O. Tarasov, Phys. Lett. B 336, 560 (1994);

[23] (Hollik 48.) L. Avdeev, J. Fleischer, S. M. Mikhailov, O. Tarasov, Phys. Lett. B 349, 597 (1995);

[24] (Hollik 48.) K.G. Chetyrkin, J.H. Kühn, M. Steinhauser, Phys. Lett. B 351, 331 (1995)

[25] (Hollik 53.) Particle Data Group, C. Caso et al., Eur. Phys. J. C 3, 1 (1998)

[26] (Hollik 57.) A. Djouadi, Nuovo Cim. A 100, 357 (1988);

[27] (Hollik 57.) B.A. Kniehl, Nucl. Phys. B 347, 86 (1990);

[28] (Hollik 57.) F. Halzen, B.A. Kniehl, Nucl. Phys. B 353, 567 (1991) 567;

[29] (Hollik 57.) A. Djouadi, P. Gambino, Phys. Rev. D 49, 3499 (1994)

[30] (Hollik 59.) K. Chetyrkin, J.H. Kühn, M. Steinhauser, Phys. 17, Reports of the Working Group on Precision Calculations for the Z Resonance, p. 175, CERN 95-03 (1995), eds. D. Bardin, W. Hollik, G. Passarino;

[31] (Hollik 59.) K.G. Chetyrkin, J.H. Kühn, A. Kwiatkowski, Phys. Rep. 277, 189 (1996)

[32] (Hollik 64.) A. Stremplat, Diploma Thesis (Karlsruhe 1998)

[33] (Hollik 65.) D. Bardin et al., Reports of the Working Group on Precision Calculations for the Z Resonance, p. 7, CERN 95-03 (1995), eds. D. Bardin, W. Hollik, G. Passarino; hep-ph/9709229

[34] (Hollik 67.) J. Bernabeu, A. Pich, A. Santamaria, Phys. Lett. B 200, 569 (1988)

[35] (Hollik 69.) K.G. Chetyrkin, A.L. Kataev, F.V. Tkachov, Phys. Lett. B 85, 277 (1979);

[36] (Hollik 69.) M. Dine, J. Sapirstein, Phys. Rev. Lett. 43, 668 (1979);

[37] (Hollik 69.) W. Celmaster, R. Gonsalves, Phys. Rev. Lett. 44, 560 (1980);

[38] (Hollik 69.) S.G. Gorishny, A.L. Kataev, S.A. Larin, Phys. Lett. B 259, 144 (1991);

[39] (Hollik 69.) L.R. Surguladze, M.A. Samuel, Phys. Rev. Lett. 66, 560 (1991);

[40] (Hollik 69.) A. Kataev, Phys. Lett. B 287, 209 (1992)

[41] (Hollik 70.) K.G. Chetyrkin, A. Kwiatkowski, Phys. Lett. B 305, 285 (1993) and B 319, 307 (1993)

[42] (Hollik 71.) S. Larin, T. van Ritbergen, J.A.M. Vermaseren, Phys. Lett. B 320, 159 (1994);

[43] (Hollik 71.) K.G. Chetyrkin, O.V. Tarasov, Phys. Lett. B 327, 114 (1994)

[44] (Hollik 72.) K.G. Chetyrkin, J. H. Kühn, A. Kwiatkowski, Phys. Rev. 101, 866 (1956);

[45] (Hollik 73.) G. Buchalla, A.J. Buras, Nucl. Phys. B 398, 285 (1993);

[46] (Hollik 73.) K.G. Chetyrkin, A. Kwiatkowski, M. Steinhauser, Mod. Phys. Lett. A 8, 2785 (1993)

[47] (Hollik 74.) A. Kwiatkowski, M. Steinhauser, Phys. Lett. B 344, 359 (1995);

[48] (Hollik 74.) S. Peris, A. Santamaria, Nucl. Phys. B 445, 252 (1995)

[49] (Hollik 75.) R. Harlander, T. Seidensticker, M. Steinhauser, Phys. Lett. B 426, 125 (1998)

[50] (Hollik 76.) A. Czarnecki, J.H. Kühn, Phys. Rev. Lett. 77, 3955 (1996); E: 80, 893 (1998)

[51] (Hollik 77.) A. Hoang, J.H. Kühn, T. Teubner, Nucl. Phys. B 455, 3 (1995); 452, 173 (1995)

[52] (Hollik 79.) G. Montagna, O. Nicrosini, F. Piccinini, Phys. Lett. B 406, 243 (1997)

[53] (Hollik 82.) SLD Collaboration, S. Fahey, talk at ICHEP98

[54] (Hollik 84.) Yu. Dokshitzer, plenary talk at ICHEP98

[55] (Hollik 85.) G.L. Fogli, D. Haidt, Z. Phys. C 40, 379 (1988);

[56] (Hollik 85.) CDHS Collaboration, H. Abramowicz

et al., Phys. Rev. Lett. 57, 298 (1986);

[57] (Hollik 85.) A. Blondel et al., Z. Phys. C 45, 361 (1990);

[58] (Hollik 85.) CHARM Collaboration, J.V. Allaby et al., Phys. Lett. B 177, 446 (1987);

[59] (Hollik 85.) CHARM Collaboration, J.V. Allaby et al., Z. Phys. C 36, 611 (1987);

[60] (Hollik 85.) CHARM II Collaboration, D. Geiregat et al., Phys. Lett. B 247, 131 (1990)

[61] (Hollik 85.) CHARM II Collaboration, D. Geiregat et al., Phys. Lett. B 259, 499 (1991);

[62] (Hollik 85.) CCFR Collaboration, C.G. Arroyo et al., Phys. Rev. Lett. 72, 3452 (1994);

[63] (Hollik 85.) CCFR Collaboration, C.G. Arroyo et al., Eur. Phys. J. C 1, 509 (1998)

[64] (Hollik 86.) NuTeV Collaboration, T. Bolton, talk at ICHEP98

[65] (Hollik 88.) G. Montagna, O. Nicrosini, F. Piccinini, G. Pas- sarino, hep-ph/9804211

[66] (Hollik 91.) K. Hagiwara, D. Haidt, S. Matsumoto, Eur. Phys. J. C 2, 95 (1998);

[67] (Hollik 91.) J. Ellis, G.L. Fogli, E. Lisi, Phys. Lett. B 389, 321 (1996);

[68] (Hollik 91.) J. Ellis, G.L. Fogli, E. Lisi, Z. Phys. C 69, 627 (1996);

[69] (Hollik 91.) S. Dittmaier, D. Schildknecht, Phys. Lett. B 391, 420 (1997);

[70] (Hollik 91.) P. Chankowski, S. Pokorski, Acta Phys. Polon. 27, 1719 (1996)

[71] (Hollik 93.) Z. Kunszt et al., in Physics at LEP 2, CERN 96- 01, Vol. 1, p. 141, eds. G. Altarelli, T. Sjostrand, F. Zwirner

[72] (Hollik 94.) W. Beenakker et al., in Physics at LEP 2, CERN 96-01, Vol. 1, p. 79, eds. G. Altarelli, T. Sjostrand, F. Zwirner

[73] (Hollik 96.) E.N. Argyres et al., Phys. Lett. B 358, 339 (1996)

[74] (Hollik 96.) U. Baur, D. Zeppenfeld, Phys. Rev. Lett. 75, 1002 (1995)

[75] (Hollik 96.) C. Papadopoulos, Phys. Lett. B 352, 144 (1995)

[76] (Hollik 97.) G. Lopez Castro, J.L. Lucio M., J. Pestieau, Int. J. Mod. Phys. A 11, 563 (1996);

[77] (Hollik 97.) M. Beuthe, R. Gonzalez Felipe, G. Lopez Castro, J. Pestieau, Nucl. Phys. B 498, 55 (1997)

[78] (Hollik 98.) W. Beenakker at al., Nucl. Phys. B 500, 255 (1997)

[79] (Hollik 99.) W. Beenakker, A. Denner, Acta Phys. Polon. B 29, 2821 (1998)

[80] (Hollik 101.) K. Melnikov, O. Yakovlev, Nucl. Phys. B 471, 90 (1996);

[81] (Hollik 101.) O. Yakovlev, 1998 private communication to W. Hollik; [80] disagrees with [82, 83] and has been corrected, Erratum to appear;

[82] (Hollik 101.) A. Denner, S. Dittmaier, S. Roth, Nucl. Phys. B519, 39 (1998);

[83] (Hollik 101.) A. Denner, S. Dittmaier, S. Roth, Phys. Lett. B 429, 145 (1998).

[84] (Hollik 102.) V.S. Fadin, V.A. Khoze, A.D. Martin, Phys. Rev. D 49, 2247 (1994)

[85] (Hollik 102.) K. Melnikov, O. Yakovlev, Phys. Lett. B 324, 217 (1994)

[86] (Hollik 103.) U. Baur, talk at ICHEP98 (PS1);

[87] (Hollik 103.) U. Baur, S. Keller, D. Wackeroth, hep-ph/9807417

[88] (Hollik 104.) D. Wackeroth, W. Hollik, Phys. Rev. D 55, 6788 (1998)

[89] (Hollik 106.) D. Treille, plenary talk at ICHEP98

[90] (Hollik 107.) L. Maiani, G. Parisi, R. Petronzio, Nucl. Phys. B 136, 115 (1979);

[91] (Hollik 107.) N. Cabibbo, L. Maiani, G. Parisi, R. Petronzio, Nucl. Phys. B 158, 259 (1979);

[92] (Hollik 107.) R. Dashen, H. Neuberger, Phys. Rev. Lett. 50, 1897 (1983);

[93] (Hollik 107.) D.J.E. Callaway, Nucl. Phys. B 233, 189 (1984);

[94] (Hollik 107.) M. Lindner, Z. Phys. C 31, 295 (1986)

[95] (Hollik 108.) M. Lindner, M. Sher, H. Zaglauer, Phys. Lett. B 228, 139 (1989);

[96] (Hollik 108.) G. Altarelli, G. Isidori, Phys. Lett. B 337, 141 (1994);

[97] (Hollik 108.) J.A. Casas, J.R. Espinosa, M. Quiros, Phys. Lett. B 342, 171 (1995);

[98] (Hollik 108.) J.A. Casas, J.R. Espinosa, M. Quiros, Phys. Lett. B 382, 374 (1996);

[99] (Hollik 109.) T. Hambye, K. Riesselmann, Phys. Rev. D 55, 7255 (1997)

[100] (Hollik 110.) J. Kuti et al., Phys. Rev. Lett. 61, 678 (1988);

[101] (Hollik 110.) P. Hasenfratz et al., Nucl. Phys. B 317, 81 (1989);

[102] (Hollik 110.) M. Luscher, P. Weisz, Nucl. Phys. B 318, 705 (1989);

[103] (Hollik 110.) M. Gockeler, H. Kastrup, T. Neuhaus, F. Zimmermann, Nucl. Phys. B 404, 517 (1993)

[104] (Hollik 111.) M. Gockeler, H. Kastrup, J. Westphalen, F. Zimmermann, Nucl. Phys. B 425, 413 (1994)

[105] (Hollik 112.) A. Frink, B. Kniehl, K. Riesselmann, Phys. Rev. D 54, 4548 (1996)

[106] (Hollik 114.) L. Durand, B.A. Kniehl, K. Riesselmann, Phys.Rev. Lett. 72, 2534 (1994);

[107] (Hollik 114.) L. Durand, B.A. Kniehl, K. Riesselmann, Phys. Rev. Lett. 74, 1699 (1995);

[108] (Hollik 114.) V. Borodulin, G. Jikia, Phys. Lett. B 391, 434 (1997)

[109] (Hollik 115.) K. Riesselmann, hep-ph/9711456

[110] (Hollik 116.) K. Adel and Y.P. Yao, Phys. Rev. D 49, 4945 (1994);

[111] (Hollik 116.) C. Greub and T. Hurth, Phys. Rev. D 56, 2934 (1997);

[112] (Hollik 116.) A.J. Buras, A. Kwiatkowski and N. Pott, Nucl. Phys. B 517, 353 (1998);

[113] (Hollik 116.) A. Ali and C. Greub, Phys. Lett. B 361, 146 (1995);

[114] (Hollik 116.) C. Greub, T. Hurth and D. Wyler, Phys. Lett. B 380, 385 (1996);

[115] (Hollik 116.) C. Greub, T. Hurth and D. Wyler, Phys. Rev. D 54, 3350 (1996);

[116] (Hollik 116.) K. Chetyrkin, M. Misiak and M. Munz, Phys. Lett. B 400, 206 (1997);

[117] (Hollik 116.) K. Chetyrkin, M. Misiak and M. Munz, Phys. Lett. B 425, 414 (1998)

[118] (Hollik 117.) A.L. Kagan and M. Neubert, hep-ph/9805303

[119] (Hollik 118.) M. Neubert, talk at ICHEP98 (PS7), hep-ph/9809377

[120] (Hollik 119.) T. Skwarnicki (CLEO Collaboration), talk at ICHEP98 (PS7)

[121] (Hollik 120.) R. Barate et al. (ALEPH Collaboration), Phys. Lett. B 429, 169 (1998)

[122] (Hollik 121.) J. Hewett, M. Neubert, talks at ICHEP98 (PS16)

[123] (Hollik 122.) V.W. Hughes, in: Frontiers of High Energy Spin Physics, Universal Academy Press, Tokyo 1992, p. 717, ed. T. Hasegawa

[124] (Hollik 123.) K. Fujikawa, B.W. Lee, A.I. Sanda, Phys. Rev. D 6, 2923 (1972);

[125] (Hollik 123.) R. Jackiw, S. Weinberg, Phys. Rev. D 5, 2473 (1972);

[126] (Hollik 123.) G. Altarelli, N. Cabibbo, L. Maiani, Phys. Lett. B 40, 415 (1972);

[127] (Hollik 123.) I. Bars, M. Yoshimura, Phys. Rev. D 6, 374 (1972);

[128] (Hollik 123.) W. Bardeen, R. Gastmans, B. Lautrup, Nucl. Phys. B 46, 315 (1972)

[129] (Hollik 124.) S. Peris, M. Perrottet, E. de Rafael, Phys. Lett. B 355, 523 (1995)

[130] (Hollik 127.) K. Adel, F.J. Yndurain, hep-ph/9509378;

[131] (Hollik 127.) D.H. Brown,W.A. Worstell, Phys. Rev. D 54, 3237 (1996)

[132] (Hollik 130.) J. Bijnens, E. Pallante, J. Prades, Nucl. Phys. B 474, 379 (1996);

[133] (Hollik 130.) J. Bijnens, E. Pallante, J. Prades, Phys. Rev. Lett. 75, 1447 (1995);

[134] (Hollik 130.) J. Bijnens, E. Pallante, J. Prades, Phys. Rev. Lett. 75, 3781 (1995)

[135] (Hollik 131.) B. Krause, Phys. Lett. B 390, 392 (1997);

[136] (Hollik 132.) S. Laporta, E. Remiddi, Phys. Lett. B 379, 283 (1996)

[137] (Hollik 133.) B. Krause, A. Czarnecki, Phys. Rev. Lett. 78, 4339 (1997)

[138] (Hollik 134.) Y. Fukuda et al., hep-ex/9805006;

[139] (Hollik 134.) Y. Fukuda et al., hep-ex/9805021;

[140] (Hollik 134.) Y. Fukuda et al., hep-ex/987003;

[141] (Hollik 134.) M. Takita, plenary talk at ICHEP98, these pro- ceedings

[142] (Hollik 135.) M. Carena, J. Espinosa, M. Quiros, C. Wagner, Phys. Lett. B 355, 209 (1995);

[143] M. Carena, M. Quiros, C. Wagner, Nucl. Phys. B 461, 407 (1996);

[144] H. Haber, R. Hempfling, A. Hoang, Z. Phys. C 75, 539 (1997);

[145] J. Rosiek, Phys. Lett. B 252, 135 (1990; M. Boulware, D. Finnell, Phys. Rev. D 44, 2054 (1991)

[146] C.S. Lee, B.Q. Hu, J.H. Yang, Z.Y. Fang, J. Phys. G 19, 13 (1993);

[147] Q. Hu, J.M. Yang, C.S. Li, Commun. Theor. Phys. 20, 213 (1993);

[148] J.D. Wells, C. Kolda, G.L. Kane, Phys. Lett. B 338, 219 (1994);

[149] J. Rosiek, Nucl. Phys. B 417, 101 (1994); D.Garcia,J.Sola‘,Mod.Phys.Lett. A9,211 (1994)

[150] (Hollik 139.) D. Garcia, R. Jiménez, J. Solá, Phys. Lett. B 347, 309 and 321 (1995);

[151] D. Garcia, J. Sola, Phys. Lett. B 357, 349 (1995);

[152] A. Dabelstein, W. Hollik, W. Mösle, in Perspectives for Electroweak Interactions in e+e Collisions, Ringberg Castle 1995, ed. B.A. Kniehl, World Sci- entific 1995 (p. 345);

[153] P. Chankowski, S. Pokorski, Nucl. Phys. B 475, 3 (1996);

[154] J. Bagger, K. Matchev, D. Pierce, R. Zhang, Nucl. Phys. B 491, 3 (1997)

[155] W. Hollik, “Standard Model Theory, Plenary talk at the XXIX International Conference on High Energy Physics, Vancouver, Canada, 23 - 29 July 1998”, arXiv 9811313v2, 15 December 1998, ICHEP1998; Our bibliography lists all of his relevant references, with the notation: e.g.

[156] G. Grzadkowski et. al., Nucl. Phys. B281 (1987) 18.

[157] W. Wetzel in ([178, 746]);

[158] W. Wetzel, Nuc. Phys. B227 (1983) 1 (Z including Z-pole, no display of m_h, m_{top} sensitivity)

[159] S. Bellucci, Nuovo Cim. 80A (1984) 279 (no display of m_{top}, m_{Higgs} sensitivity)

[160] J. Englert, R. Brout and M.F. Thiry, Nuovo Cimento 48 (1966) 244;

[161] J.C.Taylor, *Gauge Theories of Weak Interactions*, Cambridge University Press, Cambridge, UK, 1976.

[162] Glashow, S.L., Partial Symmetries of Weak Interactions, Nucl. Phys. 22, 579 (1961). doi:10.1016/0029-5582(61)90469-2 (C1).

[163] Salam, A., Weak and Electromagnetic Interactions, in Elementary particle theory : relativistic groups and analyticity, N. Svartholm (ed.), p. 367. Almqvist and Wiksell, 1968. Conf. Proc. C 680519, 367 (1968) (C1).

[164] Weinberg, S., A Model of Leptons, Phys. Rev. Lett. 19, 1264 (1967). doi:10.1103/ PhysRevLett.19.1264 (C1).

[165] V. A. Kuzmin, V. A. Rubakov, M. E. Shaposhnikov, Phys. Lett. B 155 (1985) 36 (C2).

[166] M. Fukugita, T. Yanagida, Phys. Lett. B174 (1986) 45 (C2).

[167] E. K. Akhmedov, V. A. Rubakov, A. Y. Smirnov, Phys. Rev. Lett. 81 (1998) 1359 (C2).

[168] Englert, F. and R. Brout, Broken Symmetry and the Mass of Gauge Vector Mesons, Phys. Rev. Lett. 13, 321 (1964). doi:10.1103/PhysRevLett.13.321 (C1).

[169] Guralnik, G.S., C. R. Hagen and T. W. B. Kibble, Global Conservation Laws and Massless Particles, Phys. Rev. Lett. 13, 585 (1964). doi:10.1103/PhysRevLett.13.585 (C1).

[170] Higgs, P.W., Broken symmetries, massless particles and gauge fields, Phys. Lett. 12, 132 (1964a).

doi:10.1016/0031-9163(64)91136-9 (C1).

[171] Higgs, P.W., Broken Symmetries and the Masses of Gauge Bosons, Phys. Rev. Lett. 13, 508 (1964b). doi:10.1103/PhysRevLett.13.508 (C1).

[172] Higgs, P.W., Spontaneous Symmetry Breakdown without Massless Bosons, Phys. Rev. 145, 1156 (1966). doi:10.1103/PhysRev.145.1156 (C1).

[173] Kibble, T.W.B., Symmetry breaking in non-Abelian gauge theories, Phys. Rev. 155, 1554 (1967). doi:10.1103/PhysRev.155.1554 (C1).

[174] G. Alexander et al., the LEP Collaborations ALEPH, DELPHI, L3 and OPAL, “Electroweak Parameters of the Z^0 Resonance and the Standard Model”, CERN-PPE-91-232, 20 December 1991, Phys.Lett. B276 (1992) 247-253

[175] D. Bardin, M. Consoli, M.B. Einhorn, W. Hollik, F. Jegerlehner, D.R.T. Jones, B.W. Lynn, W.J. Marciano, G. Passarino, A. Sirlin, R.G. Stuart, M.J.G. Veltman, C. Verzegnassi and their co-workers (C2).

[176] Citation in the 1999 Nobel prize in physics awarded to Carlo Rubbia and Simon van der Meer (C9).

[177] A SLAC INSPIRES search for high precision electro-weak quantum loop physics before/during 1986 reveals authors: E.S. Abers, A.A. Akhundov, D. Albert, J. Aldins, G. Altarelli, F. Antonelli, K. Aoki, H. Aoyama, T. Appelquist, A. Arbuzov, V.N. Baier, D. Bailin, R. Barbieri, G. Barbellini, J. Bardeen, W. Bardeen, D. Bardin, A. Barroso, I. Bars, C. Becchi, M.A. Beg, S. Bellucci. F.A. Berends, R.E. Behrends, J. Bernstein, D. Billi, F. Bird, J.D. Bjorken, A. Blondel, C.J. Bollini, A, Bohm, F.J. Botella, F. Boudjema, A. Bramon, S. Brodsky, R. Brout, R.W. Brown, V.M. Budnev, A.D. Bukin, G. Burgers, H. Burkhardt, N. Byers, N. Cabibbo, M. Caffo, R.N. Cahn, D.J.E. Callaway, J. Calmet, R. Cashmore, W. Celmaster, M.S. Chanowitz, J. Carazzone, K.G. Chetyrkin, J. Cole, M. Consoli, L.N. Cooper, G. Corbo, V.K. Cung, P. Cvitanovic, R. Dashen, P.H. Davervelt, S. Dawson, E. De Rafael, R. Decker, G. Degrassi, C. Deom, A. Denner, D.A. Dicus, M. Dine, V.A. Dokuchaeva, N. Dombey, A. Donnachie, A.J. Dufner, R.M. Dzhilkibaev, S.I. Edelmann, M.B. Einhorn, F. Englert, E. Etim, L.D. Fadeev, V.S. Fadin, H. Fanchiotti, S.A. Fayans, O. Fedorenko, G. Feinberg, R.J. Finkelstein, J. Fleisher, G.L. Fogli, G. Foti, S.C. Frautschi, J.M. Frere, K. Fujikawa, Y. Fujimoto, M. Fukujita, M.A. Furman, K.G.F. Gaemers, R. Gastmans, R. Gatto, J.J. Giambiagi, I.F. Ginzburg, V.L.O. Ginzburg, S. Glashow, T.J. Goldman, J. Goldstone, R. Gonsalves, G. Gounaris, M. Greco, M. Green, A.F. Grillo, B. Grzadkowski, G. Guberina, G.S. Guralnik, C.R. Hagan, J.S. Hagelin, L.J. Hall, C. Hawkes, P.W. Higgs, I. Hinchliffe, Z. Hioki, W. Hollik, M. Igarashi, C.J.C. Im, T. Inami, K. Inoue, M.Z. Iofa, R. Jackiw, S. Jadach, H.Y. Jae, W. Jaus, F. Jegerlehner, G. Jona-Lasinio, D.R.T. Jones, A. Kakuto, G. Kallen, A.L. Kataev, R. Kawabe, D.C. Kennedy, P. Khristova, T.W.B. Kibble, T. Kinoshita, V.A. Khose, R. Kleiss, R. Kogerler, J.B. Kogut, H. Komatsu, J.G. Komen, M. Konuma, G.L. Kotkin, P. Krawcszyk, J. H. Kuhn, E.A. Kuraev, V.A. Kuzmin, A. Kwiatkowski, M. Lambin, L.D. Landau, M. Landro, B. Lautrup, B.W. Lee, I. Leide, M. Lemoine, C.S. Lim, M. Lindner, W.B. Lindquist, L.N. Lipatov, C. H. Llewellyn Smith, S. Lo Presti, B.W. Lynn, R. Lytel, E. Ma, L. Maiani, G. Mann, P.D. Mannheim, W.J. Marciano, G. Martinelli, G.C. Marques, L.C. Maximon, G.V. Meledin, N.P. Merenkov, J.A. Mignaco, K.O. Mikaelian, I. Mohammed, K.J. Mork, T. Muta, Y. Nambu, N. Nakazawa, M.M. Nesterov, H. Neuberger, B. Nizic, R.E. Norton, R.J. Oakes, Y. Okamoto, H.A. Olsen, Yu. E. Olshanskii, D. Oury, S. Pakvasa, C. Panagiotakopoulos, G. Pancheri-Srivastava, V.S. Panin, N. Papanicolaou, G. Parisi, Z. Parsa, E.A. Paschos, G. Passarino, R.D. Peccei, O. Pellegrino, M. Perrotet, A.N. Peryshkin, M. Peskin, J. Pestieau, A. Peterman, R. Petronzio, S. Pokorski, E.C. Poggio, V.N. Popov, A. Pramudita, J.R. Primack, H.R. Quinn, G. Rasche, E. Remiddi, F.M. Renard, R. Renken, J.P. Revol, S. Riemann, T. Rieman, R. Rodenberg, M. Roos, D. Ross, A. Rouet, V.A. Rubakov, R. Ruckl, A. de Rujula, R. Sammers, A. Sabry, T. Sack, N. Sakai, S. Sakakibara, A. Salam, , A.I. Sanda, J. Saperstein, S. Sarantakos, A. Savoy Navarra, I.A. Savin, A. Schiller, J.R. Schrieffer, V.B. Semikoz, G. Senjanovic, V.G. Serbo, V.V. Serebryakov, R. Shankar, M.E. Shaposhnikov, S.S. Shei, T. Shimada, Y. Shimizu, D.V. Shirkov, N.M. Shumeiko, A. Sirlin, A.A. Slavnov, R. Sommer, S.P. Sorella, H. Spiesberger, Y.N. Srivastava, W.J. Stirling, M.I. Strikman, H. Surra, R. Stora, R.G. Stuart, G. ’t Hooft, S. Takashita, J.C. Taylor, H.J. Timme, F.V. Tkachov, K. Tobimatzu, H.-S. Tsao, S. Turrini, I.V. Tyutin, J. Van der Bij, W.L. Van Neerven, M.J.G. Veltman, J.A.M. Vermaseren, C. Verzegnassi, J.P. Vialle, E.A. Vinokurov, B. Ward, J.C. Ward, Z. Was, S. Weinberg, H. Wergeland, C. Wetterich, W. Wetzel, J.F. Wheater, K.G. Wilson, M. Wirbel, E. Witten, S.D.D. Willenbrock, T.F. Wong, D. Wyler, M. Yamada, T. Yanagida, A. Yano, D.R. Yennie, M. Yoshimura, B.L. Young, R. Zucchini. See also references in [155, 178, 742, 746].

[178] LEP Yellow Book, CERN publication CERN 86-02 (1986), G. Altarelli (Ed.) (C3).

[179] Llewellyn Smith, C.H., High-Energy Behavior and Gauge Symmetry, Phys. Lett. B 46, 233 (1973). doi:10.1016/0370-2693(73)90692-8 (C1).

[180] D.R. Yennie, Steven C. Frautschi, H. Surra, The infrared divergence phenomena and high-energy processes, Annals Phys. 13 (1961) 379-452,

[181] J. Goldstone,“Field Theories with Superconductor Solutions,”Nuovo Cim. **19**, 154 (1961).

[182] J. Goldstone, A. Salam and S. Weinberg,“Broken

Symmetries,"Phys. Rev. **127**, 965 (1962).

[183] Landau, L.D. On the Theory of Phase Transitions: Phys. Z. Sow. 11, 26 (1937). For English translation see [185] .

[184] Landau, L.D. On the Theory of Phase Transitions. Phys. Z. Sow. 11, 545 (1937). For English translation see [185] .

[185] L.D. Landau. Collected Papers of L.D. Landau. ed. and intro. by D. ter Haar. New York: Gordon and Breach, 1965.

[186] V.L.O. Ginzburg, L.D. Landau. Zh. Eksp. Teor. Fiz. 20, 1064 (1950). For English translation see [185].

[187] L.N. Cooper. Bound electron pairs in a degenerate fermi gas, Phys. Rev. 104, 1189 (1956);

[188] J. Bardeen, L.N. Cooper, J.R. Schrieffer. Microscopic theory of superconductivity, Phys. Rev. 106, 162 (1957);

[189] J. Bardeen, L.N. Cooper, J.R. Schrieffer. Theory of superconductivity, Phys. Rev. 108, 1175 (1957).

[190] Y. Nambu,"Quasiparticles and Gauge Invariance in the Theory of Superconductivity,"Phys. Rev. **117**, 648 (1960).

[191] Y. Nambu and G. Jona-Lasinio, Dynamical Model of Elementary Particles Based on an Analogy with Superconductivity. 1., Phys. Rev. 122, 345 (1961).

[192] P.W. Anderson, Plasmons, Gauge Invariance, and Mass. Phys. Rev. 130, 439 (1963).

[193] V.G. Vaks, A.I. Larkin, On the application of the methods of superconductivity theory to the problem of the masses of elementary particles, JETP 13 (1961) 192.

[194] K. G. Wilson and J. B. Kogut, The Renormalization group and the epsilon expansion, Phys. Rept. 12, 75 (1974).

[195] L.D. Fadeev and V. N. Popov, Feynman diagrams for the YangMills field, Phys. Lett. B 25 (1967) 2930 (Engl. transl.)

[196] Abdus Salam and John Clive Ward, Electromagnetic and weak interactions, Phys.Lett. 13 (1964) 168-171,

[197] J.C. Taylor, Nucl. Phys. B33 (1971) 436;

[198] A. Slavnov, Theor. Math. Phys. 10 (1972) 99;

[199] C. Becchi, A. Rouet and R. Stora, Renormalization of Gauge Theories, Annals Phys. 98 (1976) 287-321 CPT-75-P.723-MARSEILLE

[200] I.V.Tyutin, Lebedev Inst. Preprint (1975) unpublished.

[201] M.Z. Iofa, I.V.Tyutin, Theor. Math. Phys. 27 (1976) 316.

[202] Ray Renken and Michael E. Peskin, Corrections to Weak Interaction Parameters in Theories of Technicolor, Nucl.Phys. B211 (1983) 93-105, CLNS 82/540,

[203] E.S. Abers and B.W. Lee, Gauge Theories, Phys.Rept. 9 (1973) 1-141

[204] Ernest S. Abers, Duane A. Dicus, Richard E. Norton and Helen R. Quinn , Radiative Corrections to the Fermi Part of Strangeness-Conserving beta Decay, Phys.Rev. 167 (1968) 1461-1478

[205] Ernest S. Abers, Richard E. Norton, Duane A. Dicus, Electromagnetic Corrections to the Weak Delta S=0 Vector Coupling Constant, Phys.Rev.Lett. 18 (1967) 676-680

[206] A.I. Sanda, Parity Violating Electron Interactions Induced By One Loop Radiative Corrections, June 1978, COO-2232B-151, Conference: C78-04-28 (Neutrino 78:429), p.429 Proceedings; Dominant 1-loop Behyond SM and SM only: subdominant 1-loop SM is missing.

[207] Zohreh Parsa, Intermediate Vector Bosons And Neutrino Cosmology, Stud.Nat.Sci. 19 (1983) 139-149,

[208] Z. Was, Monte Carlo Simulation Of The Process $e^+e^- \to \tau^+\tau^-\gamma$, Acta Phys. Austriaca Suppl. 26 (1984) 447-452,

[209] J.F. Wheater, C.H. Llewellyn Smith, Electroweak Radiative Corrections to Neutrino and Electron Scattering and the Value of $sin^2(\theta_W)$, Nucl.Phys. B208 (1982) 27, Erratum: Nucl.Phys. B226 (1983) 547, OXFORD-TP-5-82-ADD., OXFORD-TP-5-82,

[210] C.H. Llewellyn Smith, J.F. Wheater, Electroweak Radiative Corrections and the Value of $sin^2(\theta_W)$, Phys.Lett. 105B (1981) 486-488, OXFORD-TP 68/81,

[211] C.H. Llewellyn Smith, The Values Of M (W), M (Z), $sin^2(\theta_W)$ And M(X) Oxford Univ. - 81-36 (81,REC.MAY), OXFORD-TP-36-81, C81-03-15-29, Conference C81-03-15, p.389-402

[212] J.F. Wheater, Radiative Corrections To Lepton Hadron Scattering Experiments, (Oxford U.) 1984, Published in In *Trieste 1983, Proceedings, Radiative Corrections In $SU(2) \times U(1)$, 329-335

[213] J.F. Wheater, Semihadronic Experiments And Weak Interactions, (Oxford U.) 1984, Published in In *Trieste 1983, Proceedings, Radiative Corrections In $SU(2) \times U(1)$, 227-236

[214] J.F. Wheater, Electroweak Radiative Corrections. J.Phys.Colloq. 43 (1982) no.C3, 305-309, Conference: C82-07-26 Proceedings

[215] J.F. Wheater, The Value of $sin^2(\theta_W)$ in Atomic Physics Experiments, Phys.Lett. 105B (1981) 483-485, OXFORD-TP-69-81, Complete 1-loop electro-weak SM.

[216] F. Boudjema, Norman Dombey, J. Cole, Low-energy Theorem for Radiative Z^0 Production, Phys.Lett. B177 (1986) 197, Print-86-0985 (SUSSEX), Contributed to Conference: C86-07-16

[217] F. Boudjema, The Z Boson Selfcouplings And Dimensional Regularization, (Sussex U.) Nov 1985, PRINT-86-0127 (SUSSEX)

[218] A. Barroso, F. Boudjema, J. Cole, Norman Dombey, Electromagnetic Properties of the Z^0 Boson, Z.Phys. C28 (1985) 149, PRINT-84-0789 (SUSSEX),

[219] Norman Dombey, Radiative Corrections In Electroweak Theory, Nature 305 (1983) 180-181,

[220] Norman Dombey, A.D. Kennedy Calculation of the Electron Anapole Moment, Phys.Lett. 91B (1980) 428-430, Print-80-0091 (SUSSEX),

[221] I. Liede, E.A. Paschos, M. Roos, S. Sakakibara, Electroweak Corrections To Differential Neutrino N Cross-sections In The Standard Model, (Mainz U., Inst. Phys.). Sep 1983, HU-TFT-83-45, DO-TH-83-21

[222] R.W. Brown, R. Decker, E.A. Paschos, Weak Corrections to the $e^+e^- \to \mu^+\mu^-$ Asymmetry, Phys.Rev.Lett. 52 (1984) 1192, (Dortmund U.) PRINT-83-0725, C83-08-04, Contributed to Int. Symp. on Lepton and Photon Interactions Conference: C83-08-04

[223] E.A. Paschos, The Weak Mixing Angle And Its Relation To The Masses M (z) And M (w), Stud.Nat.Sci. 19 (1983) 123-137, DO-TH-82-06, Conference C82-01-18,

[224] E.A. Paschos, M. Wirbel, Corrections to $sin^2(\theta_W)$ in Neutrino Experiments, Nucl.Phys. B194 (1982) 189-212, DO-TH-81-04,

[225] E.A. Paschos, Corrections to the Mixing Angle in the Grand Unified Theories Nucl.Phys. B159 (1979) 285-292, Print-79-0501 (DORTMUND),

[226] R.W. Brown, Vu Khac Cung, K.O. Mikaelian, E.A. Paschos, Electromagnetic background in the search for neutral weak currents via e+ e- –¿ mu+ mu-, Nov 1972 FERMILAB-PUB-72-097-T, NAL-THY-97

[227] Stephen L. Adler, R.W. Brown, T.F. Wong, B.L. Young, Vanishing of the second order correction to the triangle anomaly in landau-gauge, zero-fermion-mass quantum electrodynamics, Phys.Rev. D4 (1971) 1787-1808,

[228] E. Remiddi, S.P. Sorella, Analytic Value of Some QED 8th Order Contributions to the Electron Anomaly, Lett.Nuovo Cim. 44 (1985) 231, DFUB-5/85,

[229] Michele Caffo, Raoul Gatto, E. Remiddi, Hard Collinear Photons. High-energy Radiative Corrections To Bhabha Scattering, Nucl.Phys. B252 (1985) 378-388, UGVA-DPT 1984/09-444,

[230] Michele Caffo, S. Turrini, E. Remiddi, Precise Value of Some QED 8th Order Contributions to Electron Anomaly From Vacuum Polarization Graphs, Phys.Rev. D30 (1984) 483, CMU-HEP84-3,

[231] Collinear Radiation and Lepton Universality Measurements in Z^0 and W Decay Michele Caffo, Raoul Gatto (Geneva U.), E. Remiddi (Carnegie Mellon U.). Jan 1984. 10 pp. Published in Phys.Lett. 139B (1984) 439-448 UGVA-DPT 1984/01-415

[232] E. Remiddi, Radiative Corrections To Muon And Electron Anomalies, Published in In *Trieste 1983, Proceedings, Radiative Corrections In $SU(2) \times U(1)$, 85-101; and Carnegie-mellon Univ. Pittsburgh - CMU-HEP-83-12 (83,REC.NOV.), (314082), CMU-HEP83-12, Presented at Conference: C83-06-06.1 (Trieste Topical Conf.1983:85), p.85-101

[233] Michele Caffo, E. Remiddi, S. Turrini, Progress in the Analytic Evaluation of Three Loop Electron (g2) / 2 in QED, Nuovo Cim. A79 (1984) 220, DFUB 83/16,

[234] Michele Caffo, S. Turrini, E. Remiddi, Higher Order Radiative Corrections to Electron Anomaly in QED: A Remark on Asymptotic Behavior of Vacuum Polarization Insertions and Explicit Analytic Values of the First Six Ladder Graphs, Nucl.Phys. B141 (1978) 302-310, BONN-HE-78-6,

[235] D. Billi, Michele Caffo, E. Remiddi A contribution to the sixth-order electron and muon anomalies, Lett.Nuovo Cim. 4S2 (1972) 657-660, Lett.Nuovo Cim. 4 (1972) 657-660,

[236] E. Remiddi, Radiative correction in quantum electrodynamics, Comput.Phys.Commun. 4 (1972) 193-198, (BONN) PRINT-72-1924,

[237] Dong L. Lin, G. Feinberg, Radiative corrections to relativistic magnetic-dipole decays of hydrogenlike ions, Phys.Rev. A10 (1974) 1425-1429,

[238] M. Lambin, J. Pestieau, Comment On Radiative Corrections To The Decay $\pi^0 \to e^+e^-\gamma$ Phys.Rev. D31 (1985) 211-212,

[239] C. Deom, J. Pestieau, Radiative Corrections to $sin^2(\theta_W)$, Nuovo Cim. A79 (1984) 348, UCL-IPT-81-14, C83-08-04

[240] Robert Coquereaux, Aspects Of The Su(2) X U(1) Theory Of Electroweak Interactions, In *Trieste 1983, Proceedings, Radiative Corrections In Su(2) X U(1)*, 29-35

[241] Laurent Baulieu, Robert Coquereaux, Photon - Z Mixing in the Weinberg-Salam Model: Effective Charges and the a = -3 Gauge, Annals Phys. 140 (1982) 163, PRINT-81-0784 (HARVARD),

[242] Robert Coquereaux, Dimensional Renormalization and Comparison of Renormalization Schemes in Quantum Electrodynamics, Annals Phys. 125 (1980) 401, CPT-79/P-1087,

[243] Laurent Baulieu, Robert Coquereaux, Two Point Functions, Ward Identities, and a Scheme Independent Charge in the SU(2) X U(1) Theory, (Harvard U.) June 1980, HUTP-80/A039

[244] G. Gounaris, R. Kogerler, D. Schildknecht, On $Z^0 \to e^+e^-\gamma$ decays, ON Z0 —¿ e+ e- gamma DECAYS Phys.Lett. 137B (1984) 261-266, (Bielefeld) BI-TP-83/17

[245] N. Byers, R. Ruckl, A. Yano, Radiative corrections to $\nu_\mu e$ and $\bar{\nu}_\mu e$ scattering, Physica A96 (1979) 163-172, UCLA/78/TEP/22 Conference: C78-02-18 (Schwinger Sympos.1978:0163), p.0163

[246] Enrico C. Poggio, Helen R. Quinn, Fixed Wide Angle Scattering of Elementary Fermions in Gauge Theories, Phys.Rev. D12 (1975) 3279, Print-75-0191 (HARVARD),

[247] T.W. Appelquist, J.R. Primack, Helen R. Quinn, Renormalization of gauge theories, W decay, and mu decay, Phys.Rev. D7 (1973) 2998-3009,

[248] T. Appelquist, J. Carazzone, J.Terrance Goldman, Helen R. Quinn, Renormalization and gauge independence in spontaneously broken gauge theories, Phys.Rev. D8 (1973) 1747-1756,

[249] T.W. Appelquist, J.R. Primack, Helen R. Quinn, Higher-order contributions to mu decay in a spontaneously broken gauge model, Phys.Rev. D6

(1972) 2998-3011,

[250] T. Appelquist, Helen R. Quinn, Divergence cancellations in a simplified weak interaction model, Phys.Lett. 39B (1972) 229-232,

[251] Helen R. Quinn, J.D. Bjorken, Renormalization Of Weak Form-factors, And The Cabibbo Angle, Phys.Rev. 171 (1968) 1660-1661, SLAC-PUB-0381,

[252] Helen R. Quinn, Radiative Corrections To Beta Decay And Some Sum Rules For Neutrino Interactions, (Stanford U., Phys. Dept.). Sep 1967. 93, RX-327

[253] Thomas Appelquist, R. Shankar, On Gauge Theories With Heavy Higgs Bosons, Nucl.Phys. B158 (1979) 317-330, COO-3075-203a,

[254] Thomas Appelquist, J. Carazzone, Infrared Singularities and Massive Fields, Phys.Rev. D11 (1975) 2856, Print-74-1486 (HARVARD),

[255] Thomas Appelquist, J.D. Bjorken, Michael S. Chanowitz, Higher Order Corrections To Semileptonic Weak Processes, Phys.Rev. D7 (1973) 2225, SLAC-PUB-1149,

[256] Thomas Appelquist, Parametric Integral Representations Of Renormalized Feynman Amplitudes, Annals Phys. 54 (1969) 27-61, SLAC-PUB-0542,

[257] Michael S. Chanowitz, On The Radiative Corrections To The Low-energy Theorem For $\pi^0 \to \gamma\gamma$ In A Nonabelian Gauge Theory, Phys.Rev. D9 (1974) 503, SLAC-PUB-1284,

[258] B. Guberina, R.D. Peccei, R. Ruckl, Dimensional Regularization Techniques and Their Uses in Calculating Infrared Safe Weak Decay Processes, Nucl.Phys. B171 (1980) 333-361, MPI-PAE/PTh 56/79,

[259] Guido Altarelli, Electroweak Processes Beyond the Tree Approximation (INFN, Rome and Rome U.). Feb 1982. 41 pp. Published in Acta Phys.Austriaca Suppl. 24 (1982) 229-273 ROME-UNIV-289

[260] Rick Lytel, Weak Isospin Breaking and Higher Order Corrections, Phys.Rev. D22 (1980) 505, ITP-655-STANFORD,

[261] G. Senjanovic, Higher Order Corrections to Parity Violation in Atoms in SU(2) x U(1) Models, Phys.Rev. D17 (1978) 892, BNL-23017,

[262] I. Mohammad, A. Donnachie, Higher Order Corrections to Radiative Muon Decay in the Weinberg-Salam Model, (CERN). Feb 1976, CERN-TH-2132

[263] D.A. Ross, Higher order corrections in muon decay, (Oxford U.). 1972, Published in In *Marseille Univ 72/P.470(-A-), Renormalization Conference, June 1972*, 111-125

[264] W. Jaus, Charge-dependent radiative corrections to the Fermi matrix element for pure Fermi beta-decays, Nucl.Phys. A162 (1971) 97-110,

[265] B.E. Lautrup, A. Peterman, E. De Rafael, On sixth-order radiative corrections to a_μ, a_e, Nuovo Cim. A1 (1971) 238-242,

[266] An attempt to evaluate renormalized radiative corrections by computer J. Calmet, M. Perrottet (Provence U.). 1971. 10 pp. Published in J.Comput.Phys. 7 (1971) 191-200 CPT-69-P-284

[267] M. Igarashi, N. Nakazawa, T. Shimada, Y. Shimizu, Electroweak Corrections To E+ E- Reactions At High-energy, (INS, Tokyo). 1986, Conference: C83-08-11.1, p.60-65

[268] M. Igarashi, N. Nakazawa, T. Shimada, Y. Shimizu, Electroweak Corrections To The 1- T Anti-t Production At E+ E- Colliders Around 70-gev Phys.Lett. 135B (1984) 220-224,

[269] M. Igarashi, N. Nakazawa, T. Shimada, Y. Shimizu, Electroweak Corrections to Muon Pair Production in Electron - Positron Annihilation at High-energy, Nucl.Phys. B263 (1986) 347-398, UT-422-TOKYO, KUDP-84/01, TKU-HEP 84/01,

[270] Duane A. Dicus, Scott S.D. Willenbrock, Radiative Corrections to the Ratio of Z and W Boson Production, Phys.Rev. D34 (1986) 148, DOE-ER40200-041, UTTG-32-85,

[271] C. Wetterich, Can Radiative Corrections To Parity Violating Neutral Currents Distinguish Between The Weinberg-salam And Left-right Symmetric Models?, Phys.Rev. D21 (1980) 802, FREIBURG-THEP-78-4-REV, FREIBURG-THEP-78-4,

[272] A. De Rujula, R. Petronzio, A. Savoy-Navarro, Radiative Corrections to High-Energy Neutrino Scattering, Nucl.Phys. B154 (1979) 394-426, CERN-TH-2593,

[273] N.M. Shumeiko, On an Approximate Calculation of Electromagnetic Corrections to Deep Inelastic N Scattering (In Russian), Sov.J.Nucl.Phys. 29 (1979) 807, Yad.Fiz. 29 (1979) 1571-1580, JINR-P2-11744

[274] N.M. Shumeiko, Radiative Corrections for the Inverse Pion Electroproduction Process (In Russian), Sov.J.Nucl.Phys. 22 (1975) 623, Yad.Fiz. 22 (1975) 1200-1201, JINR-P2-8476

[275] Edward Witten, An SU(2) Anomaly, Phys.Lett. 117B (1982) 324-328,

[276] N. Nakazawa, T. Shimada, M. Yamada, Crewther's Constraint On Anomalies And Divergence Of Radiative Correction To Pi(l2) Decay, 1973, Conference: C73-07-23, p.533-537

[277] J. Vermaseren An Introduction To Symbolic Manipulation, (NIKHEF) 1986, Published in IN *RENESSE 1986, PROCEEDINGS, COMPUTING* 78-99.

[278] W.L. Van Neerven, J.A.M. Vermaseren The Role of the Five Point Function in Radiative Corrections to Two Photon Physics, Phys.Lett. 142B (1984) 80, NIKHEF-H/84-2,

[279] W.L. Van Neerven, J.A.M. Vermaseren Large Loop Integrals, Phys.Lett. 137B (1984) 241-244, NIKHEF-H/83-22,

[280] W.L. Van Neerven, J.A.M. Vermaseren Radiative Corrections To Two Photon Physics, Nucl.Phys. B238 (1984) 73-98, NIKHEF-H-83-11

[281] J.M. Frere, J.A.M. Vermaseren, Radiative Cor-

rections to Masses in the Standard Model With Two Scalar Doublets, Z.Phys. C19 (1983) 63-67, NIKHEF-H-82-9,

[282] David Bailin, Three Decades Of Radiative Corrections To Weak Interactions, In *Trieste 1983, Proceedings, Radiative Corrections In SU(2)l X U(1)*, 3-22, Preprint - BAILIN, D. (83,REC.NOV.), PRINT-84-0024 (SUSSEX), C83-06-06.1

[283] David Bailin, On the overall coupling constant renormalization in Weinberg's model, Nuovo Cim. A14 (1973) 199-206,

[284] David Bailin, Electromagnetic divergences in weak processes, Nuovo Cim. A10 (1972) 159-172,

[285] David Bailin, Electromagnetic Corrections to Muon and Beta Decays when Mediated by a Vector Boson, Phys.Rev. 135 (1964) B166-B180,

[286] Guido Altarelli, G. Martinelli Radiative Corrections To The Z0 Line Shape At LEP, (CERN) 1986, Published in In *Ellis, J. (Ed.), Peccei, R.d. (Ed.): Physics At Lep, Vol. 1*, 47-57

[287] Lawrence J. Hall, Radiative corrections to MZ in leading logarithm. (Harvard U.). 1981, Conference: C81-02-06, p.61-94

[288] Sally Dawson, John S. Hagelin, Lawrence J. Hall, Radiative Corrections to $sin^2(\theta_W)$ to Leading Logarithm in the W Boson Mass, Phys.Rev. D23 (1981) 2666, HUTP-80/A090,

[289] Kazuo Fujikawa, Non-trivial Realizations of the BRS Supersymmetry, Prog.Theor.Phys. 63 (1980) 1364, INS-356,

[290] K. Fujikawa, EFI), B.W. Lee, A.I. Sanda, Generalized Renormalizable Gauge Formulation of Spontaneously Broken Gauge Theories, Phys.Rev. D6 (1972) 2923-2943, FERMILAB-PUB-72-055-T, NAL-THY-55, EFI-72-022,

[291] Y. Fujimoto, H.Y. Jae, The Electron Magnetic Moment At High Temperature, Phys.Lett. 114B (1982) 359-362,

[292] Masataka Igarashi, Nobuya Nakazawa, Tokuzo Shimada, Yoshimitsu Shimizu, Initial State Radiative Corrections To The Production Of Toponium In E+ E- Annihilation In The Tristan Energy Region, J.Phys.Soc.Jap. 51 (1982) 2393-2399, KUDP-2, UT-377-TOKYO,

[293] N. Nakazawa, T. Shimada, M. Yamada, Anomalies, short-distance behavior and radiative correction to $\pi \to l\bar{\nu}$ decay, Prog.Theor.Phys. 51 (1974) 1932-1946,

[294] I.F. Ginzburg, G.L. Kotkin, V.G. Serbo, Radiative Corrections in Charge Exchange and Backward Hadron Scattering, Phys.Lett. 80B (1978) 101-104,

[295] I.F. Ginzburg, G.L. Kotkin, V.G. Serbo, Radiative Corrections to Hadron Charge Exchange and Backward Scattering (In Russian), Yad.Fiz. 28 (1978) 1025-1033

[296] V.M. Budnev, I.F. Ginzburg, G.V. Meledin, V.G. Serbo The process $pp \to ppe^+e^-$ and the possibility of its calculation by means of quantum electrodynamics only, Nucl.Phys. B63 (1973) 519-541

[297] I. F. Ginzburg, D. V. Shirkov, The renormalization group and the ultraviolet asymptotic limit of scattering (In Russian), Sov.Phys.JETP 22 (1966) 234

[298] I. F. Ginzburg, V. V. Serebryakov Electromagnetic corrections to weak interactions (In Russian), Sov.Phys.JETP 13 (1961) 1223

[299] S.A. Fayans, Radiative Corrections and Recoil Effects in the Reaction $\bar{\nu}_e P \to N\nu_e e^+\bar{\nu}_e$ at Low-energies. (In Russian), Sov.J.Nucl.Phys. 42 (1985) 590, Yad.Fiz. 42 (1985) 929-940

[300] P. Krawczyk, S. Pokorski, Magnitude Of $\mathcal{O}(\alpha^2)$ Corrections And Search For New Effects In The Electroweak Interactions, Nucl.Phys. B273 (1986) 29-45, CERN-TH-4073-84,

[301] G. Mann, T. Riemann, On Mass Shell Renormalization Scheme Of The Weinberg-Salam Theory, (DESY, Zeuthen) 1982, Conference: C82-10-28.2, p.191-196

[302] K. Tobimatsu, Y. Shimizu, Radiative Correction to $e^+e^- \to e^+e^-$ in the Electroweak Theory. 2. Corrected Elastic Cross-section and Positron Energy Spectrum, Prog.Theor.Phys. 75 (1986) 905, KEK-PREPRINT-85-59,

[303] K. Tobimatsu, Y. Shimizu, Radiative Correction to $e^+e^- \to e^+e^-e^+e^-$ in the Electroweak Theory. 1. Cross-sections for Hard Photon Emission, Prog.Theor.Phys. 74 (1985) 567, Erratum: Prog.Theor.Phys. 76 (1986) 334, KEK-PREPRINT-85-14,

[304] M. Landro, K.J. Mork, H.A. Olsen, Radiative Corrections To Neutral Boson Production In Virtual Photon Collisions Phys.Lett. B172 (1986) 445-446, TRONDHEIM-86-02,

[305] Kjell Mork, Haakon Olsen, Radiative Corrections. 1. High-Energy Bremsstrahlung and Pair Production, Phys.Rev. 140 (1965) B1661-B1674,

[306] Haakon Olsen, L.C. Maximon, Harald Wergeland. Theory of High-Energy Bremsstrahlung and Pair Production in a Screened Field, Phys.Rev. 106 (1957) no.1, 27,

[307] M. Bohm, T. Sack, Electroweak Radiative Corrections To $e^+e^- \to \gamma\gamma$ Z.Phys. C33 (1986) 157-165,

[308] Ernest Ma, A. Pramudita, Exact Formula for $\mu \to \mu e^+e^-\gamma\gamma$ Type Processes in the Standard Model, Phys.Rev. D24 (1981) 1410, UH-511-420-80,

[309] Ernest Ma, Sandip Pakvasa, Variation of Mixing Angles and Masses With q^2 in the Standard Six Quark Model, Phys.Rev. D20 (1979) 2899, UH-511-347-79,

[310] W. Jaus, G. Rasche Radiative corrections of order $Z\alpha^2$ to $0^+ \to 0^+$ $\beta\beta$ transitions, Nucl.Phys. A143 (1970) 202-212,

[311] R. Rodenberg, Some Remarks About Possible Sensitive Tests Of The Influence Of Higher Order Weak And Electromagnetic Radiative Corrections To Neutrino Lepton Scattering, Lett.Nuovo Cim. 28 (1980) 505-506,

[312] F.J. Botella, C.S. Lim Finite Renormalization Effects in Induced $\bar{s}dH$ Vertex, Phys.Rev. D34 (1986) 301, BNL-37566,

[313] C.S. Lim, T. Inami, N. Sakai, The ρ Parameter

in Supersymmetric Models, Phys.Rev. D29 (1984) 1488, INS-480,

[314] W. Beenakker, Ansgar Denner Infrared Divergent Scalar Box Integrals With Applications in the Electroweak Standard Model, Nucl.Phys. B338 (1990) 349-370, Print-89-0200 (LEIDEN),

[315] Ansgar Denner, Thomas Sack, Finite Width Effects in $e^+e^- \to Z^0Z^0e^+e^-$ Z.Phys. C45 (1990) 439, PRINT-88-0792 (WURZBURG),

[316] Robert Foot, H. Lew, Girish C. Joshi, Radiative Corrections To The Vector Boson Charged Higgs Vertex, Z.Phys. C47 (1990) 269-274, UM-P-88/53,

[317] W. Hollik, New Physics From Precision Measurements IN *ALEXANDER, G. (ED.) ET AL.: POLARIZATION AT LEP, VOL. 1* 83-120 AND HAMBURG DESY - DESY 88-106 (88,REC.AUG.), DESY-88-106, Prepared for Workshop on Polarization at Conference: C87-11-09.3,

[318] Gerrit Burgers, W. Hollik Explicit Formulae For One Loop Weak Corrections In The Onshell Scheme, IN *ALEXANDER, G. (ED.) ET AL.: POLARIZATION AT LEP, VOL. 1* 136-144 AND CERN GENEVA - TH. 5131 (88,REC.AUG.), CERN-TH-5131/88

[319] John R. Ellis, Gian Luigi Fogli The Mass of the Top Quark from Electroweak Radiative Corrections, Phys.Lett. B213 (1988) 526-530, CERN-TH-5107/88, BARI-TH/88-29,

[320] Gerrit Burgers, The Shape And Size Of The Z Resonance, IN *ALEXANDER, G. (ED.) ET AL.: POLARIZATION AT LEP, VOL. 1* 121-135 AND CERN GENEVA - TH. 5119 (88,REC.AUG.), CERN-TH-5119/88

[321] Ansgar Denner, T. Sack, ELECTROWEAK RADIATIVE CORRECTIONS TO $e^+e^- \to Z^0Z^0$, Nucl.Phys. B306 (1988) 221-238, Print-88-0170 (WURZBURG),

[322] B.K. Kerimov, M.Ya. Safin, Second Born Approximation Corrections To Electroweak Asymmetry Of The Cross-section Of Longitudinally Polarized Electron Scattering By Finite Size Nuclei. (in Russian), Sov.J.Nucl.Phys. 47 (1988) 126-131, Yad.Fiz. 47 (1988) 195-204

[323] J. Kripfganz, H. Perlt, Electroweak Radiative Corrections and Quark Mass Singularities. Z.Phys. C41 (1988) 319-321,

[324] T. Riemann, M. Sachwitz, Z Boson Line Shape and $\sin^2(\theta_W)$, Phys.Lett. B212 (1988) 488, DESY-PHE-88-10,

[325] M.C. Noecker, B.P. Masterson, Carl E. Wieman, Precision measurement of parity nonconservation in atomic Cesium: A Low-energy test of the electroweak theory, Phys.Rev.Lett. 61 (1988) 310-313,

[326] Junpei Fujimoto, Yoshimitsu Shimizu, Radiative Corrections to $e^+e^- \to t\bar{t}$ in Electroweak Theory, Mod.Phys.Lett. 3A (1988) 581, DPNU-87-66,

[327] G. Gounaris, D. Schildknecht, The Radiative Corrections to the Electroweak Parameters in the Dominant Fermion Loop Approximation, Z.Phys. C40 (1988) 447, CERN-TH-4940-87, BI-TP-87-22,

[328] V.A. Kovalchuk, I.V. Stoletnyi, Differential And Total Cross-sections Of The $e^+e^- \to \mu^+\mu^-\gamma$ Process In Terms Of The Theory Of Electroweak Interaction. (in Russian), Ukr.Fiz.Zh.(Russ.Ed.) 32 (1987) 645-650

[329] Victor S. Fadin, Valery A. Khoze, Electroweak Radiative Corrections to the Z0 Line Shape in the Processes of $\mu^+\mu^-$ Production in e^+e^- Colliding Beams, Sov.J.Nucl.Phys. 47 (1988) 1073, Yad.Fiz. 47 (1988) 1693-1707, IYF-87-157

[330] A. Djouadi, Quark Mass Effects to $\mathcal{O}(\alpha_{QCD}$O in e+e Hadrons Asymmetries and Precision Tests of Electroweak Physics, Z.Phys. C39 (1988) 561, PM/87-52,

[331] M. Bohm, H. Spiesberger, Radiative Corrections To Charged Current Deep Inelastic Electron - Proton Scattering At HERA, Nucl.Phys. B304 (1988) 749-766, PRINT-88-0076 (WURZBURG),

[332] Julius Kuti, Lee Lin, Yue Shen, Upper Bound on the Higgs Mass in the Standard Model, Phys.Rev.Lett. 61 (1988) 678, UCSD/PTH-87-18,

[333] The One Loop Effects In The Electroweak Glashow-weinberg-salam Theory P.Kh. Khristova (Preslavski U.). 1987. 18 pp. Published in Acta Phys.Polon. B18 (1987) 3-20

[334] Magnetic Moments of Dirac and Majorana Neutrinos K.S. Babu, V.S. Mathur (Rochester U.). Jun 30, 1987. 5 pp. Published in Phys.Lett. B196 (1987) 218-222 UR-1011, DOE-ER13065-496

[335] Electroweak Radiative Corrections To A Left-right Asymmetry In Electron Scattering On Nuclei. (in Russian) V.N. Alizade, B.K. Kerimov, A.I. El-Gawhari (Moscow State U.). Jun 1987. 7 pp. Published in Sov.J.Nucl.Phys. 45 (1987) 1067-1072, Yad.Fiz. 45 (1987) 1723-1732

[336] ELECTROWEAK FORM-FACTORS OF pi+ — ¿ e+ e- electron-neutrino e+ DECAY (In Russian) E.Z. Avakian, S.L. Avakian (Uzbekistan Natl. U.), G. Ganbold, M. Dineykhan (Dubna, JINR). Jun 1987. 6 pp. Published in Submitted to: Pisma Zh.Eksp.Teor.Fiz. JINR-P2-87-485

[337] RADIATIVE EFFECTS OF E(6) EXOTIC FERMIONS ON PRECISION MEASUREMENTS OF SIN**2Theta(W) Joseph D. Lykken (Los Alamos). May 22, 1987. 24 pp. Published in Submitted to: Phys.Rev.D LA-UR-87-1051

[338] One Loop Compositeness Contributions to the Propagators of Electroweak Bosons Stephan Narison (CERN). Apr 1987. 9 pp. Published in Phys.Lett. B194 (1987) 420-428 CERN-TH-4700-87, PM87-19

[339] Measurement of parity non-conserving optical rotation in the 648 nm transition in atomic bismuth J.D. Taylor, P.E.G. Baird, R.G. Hunt, M.J.D. Macpherson, G. Nowicki, P.G.H. Sandars, D.N. Stacey (Oxford U., Ctr. Quantum Comp.). 1987. 20 pp. Published in J.Phys. B20 (1987) 5423-5442

[340] Radiative corrections at HERA: A Monte Carlo

study Christian M. Kiesling (Munich, Max Planck Inst.). 1987. Conference: C87-10-12, p.653-676

[341] One Loop Electroweak Radiative Corrections In E+ E- —¿ W+ W- Revisited P. Kalyniak, M.K. Sundaresan (Carleton U.). 1987. Published in IN *LAKE LOUISE 1987, PROCEEDINGS, SELECTED TOPICS IN ELECTROWEAK INTERACTIONS* 532-536.

[342] On The Radiative Corrections To The Parity Violating Atomic Potential Beyond The Standard Model I. Caprini, L. Micu (Bucharest, IFIN-HH). 1987. 4 pp. Published in Rom.J.Phys. 32 (1987) 693-696

[343] ELECTROWEAK RADIATIVE CORRECTIONS TO e+ e- —¿ gamma gamma, gamma Z0, W+ W-, Z0 Z0 Thomas Sack (Wurzburg U.). 1987. 55 pp. RX-1215 (WURZBURG)

[344] Calculation of the Anapole Moment of the Neutrino M. Abak, C. Aydin (Karadeniz U.). 1987. 5 pp. Published in Europhys.Lett. 4 (1987) 881-885

[345] Nonlinear Renormalization Group Flow In The Standard Model Of Electroweak Interactions And Some Of Its Extensions. (in German) M. Lindner (Munich U.). 1987. Published in Muenchen Mpi Phys. Astrophys. - MPI-PAE-PTH 87-68 (87,REC.SEP.) 124p

[346] Precision Measurement Of M (w), M (z) On Hadron Colliders And Restrictions For H Boson And T Quark Masses (In Russian) S.I. Alekhin (Serpukhov, IHEP). Jan 1987. 7 pp. Published in Submitted to: Yadernaya Fiz. IFVE-87-7

[347] Testing O (alpha) Corrections Of The Electroweak Theory: A Systematic Overview B. Grzadkowski (Warsaw U.), P. Krawczyk (CERN), J. Pawelczyk (Warsaw U.), S. Pokorski (CERN). Oct 1984. 20 pp. Published in Phys.Rev. D35 (1987) 2794 CERN-TH-4041-84

[348] Vector Boson Scattering at e+eee Colliders as a Test of WW, Z0Z0, Selfinteractions M. Kuroda (Bielefeld U.), F.M. Renard (Montpellier U.), D. Schildknecht (CERN). Oct 1987. 33 pp. Published in Z.Phys. C40 (1988) 575 CERN-TH-4880/87, BI-TP-87/15

[349] Proposal For Polarization At The SLC D. Blockus (Indiana U.) et al.. Apr 18, 1986. 176 pp. SLAC-PROPOSAL-SLC-UPGRADE-01

[350] Polarization At Lep / Slc: Summary Of Panel Discussion On Polarization Phenomena At LEP-1 / SLC / LEP-2 R. Cahn (CERN and LBL, Berkeley), B.W. Lynn, C.Y. Prescott (SLAC). Dec 1985. Conference: C85-06-10.1, p.411-417

[351] e+ e- —¿ W+ W-: A High-energy magnifying glass S.B. Selipsky (Stanford U.). 1988. Published in In *Snowmass 1988, Proceedings, High energy physics in the 1990s* 243-244 Prepared for Conference: C88-06-27.1, p.243-244

[352] M.E. Peskin and D.V. Schroeder, Introduction to Quantum Field Theory, Westview/Perseus Press, Cambridge MA, 1995.

[353] Steven Weinberg, Quantum Theory of Fields, Volume 1, Cambridge University Press (1995), Cambridge UK;

[354] P. Ramond, Journeys Beyond the Standard Model, Westview/Perseus Press, Cambridge MA, 2004

[355] F. Wilczek, arXiv:1507.05505, July 2015 (C9).

[356] Precision Electroweak Measurements on the Z Resonance, The ALEPH, DELPHI, L3, OPAL, SLD Collaborations, The LEP Electroweak Working Group, The SLD Electroweak and Heavy Flavour Groups, arXiv/hep-ex/0509008, Phys.Rep. 427 (2006) 257 (C6).

[357] LEP Electro-weak working group, website LEPEWWG (C6).

[358] J.D. Wells, The theoretical physics ecosystem behind the discovery of the Higgs boson, arXiv:1609.04268.

[359] ATLAS collaboration, Phys. Lett. B **716** (2012) 1-29 Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

[360] CMS Collaboration, Phys. Lett. B 716 (2012) 30-61

[361] J.A. Thomas private communication; As of November 2016, neither ATLAS nor CMS have measured $H \to b\bar{b}$ (C6).

[362] S. Bethke, Nucl. Phys. Proc. Suppl. 135 (2004) 345, arXiv:hep-ex/0606035; Modern data yields $\alpha_{QCD}(M_Z) = 0.1189 \pm 0.0010$ (C3).

[363] F. del Aguila, M. Martinez, M. Quiros, Nucl. Phys. B381 (1992) 451, CERN-TH-6389-92 (C6).

[364] M. Martinez, J.Harton, A. Blondel, 1993 private communication (C6).

[365] D. Buskulic et. al., the ALEPH collaboration, Z. Phys. C60 (1993) 71, D01:10.1007/BF01650432; got $m_{top}^{ALEPH1993} = 156^{+22+17}_{-25-22}$ where the 2nd error is from m_{BEH} (C6).

[366] M. Martinez in JACA (1994) 87, IFAE-UAB-94-02; C94-02-07; got, from ≈2,000,000 Z-decays in 1989-1993 LEP data, $m_{top}^{LEP1993} = 173^{+12+18}_{-13-20}$, where the 2nd error is from m_{BEH} (C6).

[367] Citation in the 1999 Nobel prize in physics awarded to G. 't Hooft and M.J.G. Veltman (C9).

[368] Citation in the 2013 Nobel prize in physics awarded to F. Englert and P. Higgs (C9).

[369] ME Peskin and T Takeuchi, A New constraint on a strongly interacting Higgs sector, Phys.Rev.Lett. 65 (1990) 964-967 SLAC-PUB-5272, June 1990,

[370] M. Golden and L. Randall, Nucl. Phys. B361 (1990) 3;

[371] B. Holdom and J. Terning, Phys. Lett.B247 (1990) 88;

[372] M. E. Peskin and T. Takeuchi, Estimation of oblique electroweak corrections, Phys.Rev. D46 (1992) 381-409, SLAC-PUB-5618,

[373] Extended technicolor corrections to the Z b anti-b vertex Elizabeth H. Simmons (Harvard U.), R.Sekhar Chivukula, Stephen B. Selipsky (Boston U.). Jun 1992. 5 pp. Published in In *Ottawa 1992, Beyond the standard model 3* 411-415 HUTP-92-A024, C92-06-22

[374] Nonoblique effects in the Z b anti-b vertex from ETC dynamics R.Sekhar Chivukula, Stephen B. Selipsky (Boston U.), Elizabeth H. Simmons (Harvard U.). Apr 1992. 6 pp. Published in Phys.Rev.Lett. 69 (1992) 575-577 BUHEP-92-12, HUTP-92-A017

[375] The Higgs working group: Summary report Higgs Working Group Collaboration (D. Cavalli (INFN, Milan) et al.). Mar 2002. 120 pp. FERMILAB-CONF-01-477 To appear in the proceedings of Workshop on Physics at Conference: C01-05-21.1, p.1-120 Proceedings e-Print: hep-ph/0203056

[376] Report of the Tevatron Higgs working group Higgs Working Group Collaboration (Marcela Carena (Fermilab) et al.). Oct 2000. 185 pp. FERMILAB-CONF-00-279-T, SCIPP-00-37 e-Print: hep-ph/0010338 Necessary TeVatron luminosity upgrade. 3 sigma discovery in 100-190 GeV mass range

[377] Higgs physics at LEP-2 Marcela Carena et al.. Feb 1996. 112 pp. Prepared for Conference: C95-11-02, Conference: C95-02-02.2, p.351-462 e-Print: hep-ph/9602250

[378] The Master differential equations for the two loop sunrise selfmass amplitudes Michele Caffo (INFN, Bologna and Bologna U.), H. Czyz (Silesia U.), S. Laporta (Bologna U.), E. Remiddi (Bologna U. and INFN, Bologna). May 1998. 27 pp. Published in Nuovo Cim. A111 (1998) 365-389 DFUB-98-5, TP-USL-98-4

[379] e-Print: hep-th/9805118 CERN), Z. Was (Cracow, INP and CERN). Apr 2001. 55 pp. Published in Comput.Phys.Commun. 140 (2001) 475-512 CERN-TH-2001-040, UTHEP-01-0102 e-Print: hep-ph/0104049

[380] The Present theoretical error on the Bhabha scattering cross-section in the luminometry region at LEP A. Arbuzov (Dubna, JINR) et al.. May 1996. 7 pp. Published in Phys.Lett. B383 (1996) 238-242 e-Print: hep-ph/9605239

[381] J. Garcia and R. Hunter, Once in a while you get shown the light, in the strangest of places if you look at it right, GD72 (1977) 0805;

[382] E. Kraus and K. Sibold, Z. Phys. C 68 (1995) 331 [arXiv:hep-th/9503140].

[383] E. Kraus and K. Sibold, arXiv hep-th 9608143, Aug. 1996;

[384] E. Kraus and K. Sibold, arXiv hep-th 9608143, Aug. 1996;

[385] E. Kraus, Annals Phys. 262 (1998) 155 [arXiv:hep-th/9709154].

[386] (Hollik 9.) A. Sirlin, Phys. Rev. D 22, 971 (1980);

[387] (Hollik 9.) A. Sirlin, W. J. Marciano, Nucl. Phys. B 189, 442 (1981)

[388] (Hollik 20.) W.J. Marciano, A. Sirlin, Phys. Rev. Lett. 46, 163 (1981);

[389] (Hollik 20.) A. Sirlin, Phys. Lett. B 232, 123 (1989)

[390] (Hollik 21.) G. Degrassi, S. Fanchiotti, A. Sirlin, Nucl. Phys. B 351, 49 (1991)

[391] (Hollik 22.) G. Degrassi, A. Sirlin, Nucl. Phys. B 352, 342 (1991)

[392] (Hollik 51.) R.E. Behrends, R.J. Finkelstein, A. Sirlin, Rev. Lett. 75, 3394 (1995)

[393] (Hollik 58.) B.A. Kniehl, A. Sirlin, Nucl. Phys. B 371, 141 (1992);

[394] (Hollik 58.) S. Fanchiotti, B.A. Kniehl, A. Sirlin, Phys. Rev. D 48, 307 (1993)

[395] (Hollik 58.) B.A. Kniehl, A. Sirlin, Phys. Rev. D 47, 883 (1993);

[396] (Hollik 58.) S. Fanchiotti, B.A. Kniehl, A. Sirlin, Phys. Rev. D 48, 307 (1993)

[397] (Hollik 60.) A. Sirlin, Phys. Rev. D 29, 89 (1984)

[398] (Hollik 61.) G. Degrassi, P. Gambino, A. Sirlin, Phys. Lett. B 394, 188 (1997);

[399] (Hollik 61.) G. Degrassi, P. Gambino, M. Passera, A. Sirlin, Phys. Lett. B 418, 209 (1998)

[400] (Hollik 66.) G. Degrassi, P. Gambino, A. Sirlin, TUM-HEP- 333/98 (to appear), and private communication to W. Hollik

[401] (Hollik 72.) T. Kinoshita, A. Sirlin, Phys. Rev. (1959) 113, 1652

[402] (Hollik 83.) P. Gambino, A. Sirlin, Phys. Rev. Lett. 73, 621 (1994)

[403] (Hollik 105.) M. Passera, A. Sirlin, Acta Phys. Polon. B 29, 2901 (1998)

[404] (Hollik 107.) M.A. Beg, C. Panagiotakopoulos, A. Sirlin, Phys. Rev. Lett. 52, 883 (1984);

[405] A. Sirlin and R. Zucchini, Nucl. Phys. B266 (1986) 389.

[406] T.K. Kinoshita, A. Sirlin, Radiative corrections to Fermi interactions, Phys.Rev. 113 (1959) 1652-1660

[407] T.K. Kinoshita, A. Sirlin, Muon Decay with Parity Nonconserving Interactions and Radiative Corrections in the Two-Component Theory, Phys.Rev. 107 (1957) 593-599,

[408] M. Consoli, A. Sirlin, The Role Of The One Loop Electroweak Effects In $e^+e^- \to \mu^+\mu^-$, 1986, Published in In *Ellis, J. (Ed.): Peccei, R.d. (Ed.): Physics At Lep, Vol. 1*, 63-89

[409] A. Sirlin, R. Zucchini, Accurate Verification of the Conserved Vector Current and Standard Model Predictions, Phys.Rev.Lett. 57 (1986) 1994-1997,

[410] W.J. Marciano and A. Sirlin, Radiative Corrections to beta Decay and the Possibility of a Fourth Generation, Phys.Rev.Lett. 56 (1986) 22, BNL-37130,

[411] A. Sirlin, R. Zucchini, Dependence of the Quartic Coupling H(m) on M(H) and the Possible Onset of New Physics in the Higgs Sector of the Standard Model, Nucl.Phys. B266 (1986) 389-409.

[412] Stefano Bertolini, Alberto Sirlin, Effects of Unknown Fermion Generations on the M (W), M (Z) Interdependence, Nucl.Phys. B248 (1984) 589-614.

[413] A. Sirlin, Higher Order Effects In The $SU(2) \times U(1)$ Theory, Published in Trieste 1983 Proceedings, Radiative Corrections In $SU(2) \times U(1)$, 155-174; B.W. Lynn and J.F. Wheater eds., World Scientific, Singapore 1984.

[414] W.J. Marciano and A. Sirlin, Testing the Stan-

dard Model by Precise Determinations of W+- and Z Masses, Phys.Rev. D29 (1984) 945, Erratum: Phys.Rev. D31 (1985) 213, BNL-33819 ,

[415] A. Sirlin, On the $\mathcal{O}(\alpha^2)$ Corrections to tau (mu), m (W), m (Z) in the $SU(2)_L \times U(1)$ Theory, Phys.Rev. D29 (1984) 89, Rockefeller U. RU 82/B/60,

[416] W.J. Marciano and A. Sirlin, On Some General Properties of the O(alpha) Corrections to Parity Violation in Atoms, Phys.Rev. D29 (1984) 75, Erratum: Phys.Rev. D31 (1985) 213, PRINT-83-0560 (BNL), BNL-33398,

[417] S. Sarantakos, A. Sirlin, W.J. Marciano, Radiative Corrections to Neutrino-Lepton Scattering in the SU(2)-L x U(1) Theory, Nucl.Phys. B217 (1983) 84-116, Print-82-0772 (BNL),

[418] W.J. Marciano, A. Sirlin, Radiative Corrections To Atomic Parity Violation, Phys.Rev. D27 (1983) 552, Print-82-0601 (BNL), BNL-31653 ,

[419] A. Sirlin, Large M_W, M_Z Behavior of the $\mathcal{O}(\alpha)$ Corrections to Semileptonic Processes Mediated by $W^{\pm}$, Nucl.Phys. B196 (1982) 83-92, NYU/TR8/81,

[420] A. Sirlin, A Class of Useful Identities Involving Correlated Direct Products of γ Matrices, Nucl.Phys. B192 (1981) 93-99, NYU/TR4/81,

[421] A. Sirlin, W.J. Marciano, Radiative Corrections to $\nu_\mu N \to \mu X$ and their Effect on the Determination of ρ^2 and $sin^2(\theta_W)$, Nucl.Phys. B189 (1981) 442-460, NYU-TR3-81,

[422] W.J. Marciano and A. Sirlin, Radiative Corrections to Neutrino Induced Neutral Current Phenomena in the $SU(2)_L \times U(1)$ Theory, Phys.Rev. D22 (1980) 2695, Erratum: Phys.Rev. D31 (1985) 213, COO-2232B-206,

[423] A. Sirlin, Radiative Corrections in the SU(2)-L x U(1) Theory: A Simple Renormalization Framework, Phys.Rev. D22 (1980) 971-981, PRINT-80-0267 (IAS,PRINCETON),

[424] S.S. Shei, A. Sirlin, H.-S. Tsao, Radiative Corrections to Beta and $\mu\mu$ Decays in $SU(2)_L \times U(1)$ Models Involving 2 nn Flavors, Phys.Rev. D19 (1979) 981, NYU/TR9/78, COO-2232B-160,

[425] A. Sirlin, Current Algebra Formulation of Radiative Corrections in Gauge Theories and the Universality of the Weak Interactions, Rev.Mod.Phys. 50 (1978) 573, Erratum: Rev.Mod.Phys. 50 (1978) 905, NYU-TR12-77,

[426] A. Sirlin, Generalization of the Radiative Corrections to beta and mu Decays in the SU(2)-L x U(1) Gauge Model, Nucl.Phys. B100 (1975) 291-301, NYU/TR6/75,

[427] W.J. Marciano and A. Sirlin, On the Renormalization of the Charm Quartet Model, Nucl.Phys. B93 (1975) 303-323, NYU/TR1/75, COO-2232B-67,

[428] W.J. Marciano and A. Sirlin, Dimensional Regularization of Infrared Divergences, Nucl.Phys. B88 (1975) 86-98, NYU/TR19/74,

[429] A. Sirlin, Universal Renormalization in Leptonic and Semileptonic Amplitudes, Phys.Rev.Lett. 32 (1974) 966, NYU/TR2/74,

[430] A. Sirlin, Radiative corrections to g(v)/g(mu) in simple extensions of the su(2) x u(1) gauge model, Nucl.Phys. B71 (1974) 29-51,

[431] A. Sirlin, Radiative Corrections to Weak Interactions, AIP Conf.Proc. 23 (1975) 114-126, Conference: C74-09-05 Proceedings

[432] C.G. Bollini, J.J. Giambiagi, A. Sirlin, Remarks concerning the renormalized coupling constants of the gauge theories, Nuovo Cim. A16 (1973) 423-436,

[433] M.A.B. Beg, J. Bernstein, A. Sirlin, Questions pertaining to charge dependence of radiative corrections to superallowed fermi transitions, Phys.Rev. D6 (1972) 2597-2606,

[434] H. Fanchiotti, H.O. Girotti, A. Sirlin, Convergence of the lowest-order photon-photon scattering amplitude in the gauge theories, Lett.Nuovo Cim. 4S2 (1972) 826-828, Lett.Nuovo Cim. 4 (1972) 826-828,

[435] A. Sirlin, Radiative corrections to the Goldberger-Treiman relation - high- frequency contributions, Phys.Rev. D5 (1972) 436-444,

[436] A. Sirlin, Mass divergences and Callan-symanzik equations in quantum electrodynamics, Phys.Rev. D5 (1972) 2132-2134,

[437] M. Roos, A. Sirlin, Remarks on the radiative corrections of order alpha-squared to muon decay and the determination of g(mu), Nucl.Phys. B29 (1971) 296-304,

[438] M.A.B. Beg, J. Bernstein, A. Sirlin, Z dependence of radiative corrections to beta decay, Phys.Rev.Lett. 23 (1969) 270-273,

[439] A. Sirlin, Divergent part of the second order electromagnetic corrections to the ratio g(a)/g(v), Phys.Rev. 176 (1968) 1871-1880,

[440] A. Sirlin, General Properties of the Electromagnetic Corrections to the Beta Decay of a Physical Nucleon, Phys.Rev. 164 (1967) 1767-1775,

[441] A. Sirlin, Electromagnetic Corrections, Current Algebra, and the Intermediate Boson, Phys.Rev.Lett. 19 (1967) 877-880,

[442] R.E. Behrends, R.J. Finkelstein, A. Sirlin, Radiative corrections to decay processes, Phys.Rev. 101 (1956) 866-873,

[443] W.J. Marciano, A. Sirlin, Electroweak Radiative Corrections to tau Decay, Phys.Rev.Lett. 61 (1988) 1815-1818,

[444] Remarks Concerning The Accurate Measurement Of Delta R And Sin**2theta(w) And Constants On M(t), M(h) And Compositeness A. Sirlin (Rockefeller U.). Jul 14, 1987. 13 pp. Published in Comments Nucl.Part.Phys. 17 (1987) no.6, 279-291 RU87-B1-10

[445] Radiative corrections in the standard model A. Sirlin (New York U.). May 1984. 11 pp. Published in AIP Conf.Proc. 300 (1994) 331-341 NYU/TR5/84

[446] Electroweak Radiative Corrections to tau Decay W.J. Marciano (Brookhaven), A. Sirlin (New York U.). 1988. 4 pp. Published in Phys.Rev.Lett.

61 (1988) 1815-1818

[447] Implications of a Precise Z Boson Mass Determination Paul Langacker (Pennsylvania U.), William J. Marciano (Brookhaven), Alberto Sirlin (Rockefeller U.). Jul 1987. 10 pp. Published in Phys.Rev. D36 (1987) 2191 UPR-0334-T

[448] G. Degrassi and A. Sirlin, Phys.Rev. D46 (1992) 3104.

[449] Considerations concerning the radiative corrections to muon decay in the Fermi and standard theories A. Ferroglia, G. Ossola, A. Sirlin (New York U.). May 1999. 15 pp. Published in Nucl.Phys. B560 (1999) 23-32 NYU-TH-99-05-02 e-Print: hep-ph/9905442

[450] Test of the heavy top expansion in the evaluation of M(W) and sin**2 theta**lept(eff) P. Gambino (Munich, Tech. U.), A. Sirlin (Munich, Max Planck Inst.), G. Weiglein (Karlsruhe U.). Mar 1999. 11 pp. Published in JHEP 9904 (1999) 025 TUM-HEP-342-99, MPI-PHT-99-06, KA-TP-3-1999 e-Print: hep-ph/9903249

[451] Mass and width of a heavy Higgs boson Bernd A. Kniehl, Alberto Sirlin (Munich, Max Planck Inst.). Jul 1998. 8 pp. Published in Phys.Lett. B440 (1998) 136-140 MPI-PHT-98-56 e-Print: hep-ph/9807545

[452] Radiative corrections to W and quark propagators in the resonance region M. Passera, A. Sirlin (New York U.). Jul 1998. 16 pp. Published in Acta Phys.Polon. B29 (1998) 2901-2915 NYU-TH-98-06-01 Talk given at Conference: C98-04-19 Proceedings e-Print: hep-ph/9807218

[453] Differences between the pole and on-shell masses and widths of the Higgs boson Bernd A. Kniehl, Alberto Sirlin (New York U.). May 1998. 9 pp. Published in Phys.Rev.Lett. 81 (1998) 1373-1376 NYU-TH-98-05-01, MPI-PHT-98-36 e-Print: hep-ph/9805390

[454] The Role of M(w) in precision studies of the standard model G. Degrassi (CERN), P. Gambino (Munich, Max Planck Inst.), M. Passera (Brookhaven), A. Sirlin (Munich, Max Planck Inst.). Aug 1997. 8 pp. Published in Phys.Lett. B418 (1998) 209-213 CERN-TH-97-197, MPI-PHT-97-048, NYU-TH-97-08-01 e-Print: hep-ph/9708311

[455] Mass and width of a heavy Higgs boson Bernd A. Kniehl, Alberto Sirlin (Munich, Max Planck Inst.). Jul 1998. 8 pp. Published in Phys.Lett. B440 (1998) 136-140 MPI-PHT-98-56 e-Print: hep-ph/9807545

[456] Radiative corrections to W and quark propagators in the resonance region M. Passera, A. Sirlin (New York U.). Apr 1998. 18 pp. Published in Phys.Rev. D58 (1998) 113010 NYU-TH-98-04-01 e-Print: hep-ph/9804309

[457] Estimations of order alpha-s**3 and alpha-s**4 corrections to mass dependent observables K.G. Chetyrkin (Moscow, INR and Munich, Max Planck Inst.), Bernd A. Kniehl (Munich, Max Planck Inst.), A. Sirlin (New York U.). Feb 1997. 10 pp. Published in Phys.Lett. B402 (1997) 359-366 MPI-PHT-97-010, NYU-TH-97-03-01 e-Print: hep-ph/9703226

[458] Precise calculation of M(W), sin**2 theta(W) (M(Z)), and sin**2 theta(eff)(lept) Giuseppe Degrassi, Paolo Gambino (Munich, Max Planck Inst.), Alberto Sirlin (New York U.). Nov 1996. 10 pp. Published in Phys.Lett. B394 (1997) 188-194 NYU-TH-96-11-02, MPI-PHT-96-118 e-Print: hep-ph/9611363

[459] Analysis of the Z0 resonant amplitude in the general R(xi) gauges Massimo Passera (Brookhaven), Alberto Sirlin (Munich, Max Planck Inst.). Jul 1996. 7 pp. Published in Phys.Rev.Lett. 77 (1996) 4146-4149 MPI-PHT-96-51 e-Print: hep-ph/9607253

[460] Consistency condition for the pinch technique selfenergies at two loops Kostas Philippides, Alberto Sirlin (New York U.). Feb 1996. 6 pp. Published in Nucl.Phys. B477 (1996) 59-64 NYU-TH-96-02-02 e-Print: hep-ph/9602404

[461] Scheme and scale dependences of leading electroweak corrections Bernd A. Kniehl (Fermilab and Washington U., Seattle), Alberto Sirlin (New York U.). Aug 1995. 27 pp. Published in Nucl.Phys. B458 (1996) 35-51 FERMILAB-PUB-95-246-T, DOE-ER-40561-223, INT-95-17-08, MPI-PHT-95-75, NYU-TH-95-07-03

[462] Renormalon contributions to Delta rho Paolo Gambino, Alberto Sirlin (New York U.). May 1995. 6 pp. Published in Phys.Lett. B355 (1995) 295-300 NYU-TH-95-05-02 e-Print: hep-ph/9505426

[463] Leading vacuum polarization contributions to the relation between pole and running masses Kostas Philippides, Alberto Sirlin (New York U.). Mar 1995. 27 pp. Published in Nucl.Phys. B450 (1995) 3-20 NYU-TH-95-03-01 e-Print: hep-ph/9503434

[464] Solar neutrinos: Radiative corrections in neutrino - electron scattering experiments John N. Bahcall (Princeton, Inst. Advanced Study), Marc Kamionkowski (Princeton, Inst. Advanced Study and Columbia U.), Alberto Sirlin (New York U.). Feb 1995. 40 pp. Published in Phys.Rev. D51 (1995) 6146-6158 IASSNS-AST-95-11, INSTITUTE-FOR-ADVANCED-STUDY-AST95-11 e-Print: astro-ph/9502003

[465] Considerations concerning the QCD corrections to Alberto Sirlin (New York U.). Aug 1994. 10 pp. Published in Phys.Lett. B348 (1995) 201-206, Addendum: Phys.Lett. B352 (1995) 498 NYU-TH-94-08-01 e-Print: hep-ph/9409303

[466] Evidence for bosonic electroweak corrections in the standard model Paolo Gambino (New York U.), Alberto Sirlin (Brookhaven). Apr 1994. 9 pp. Published in Phys.Rev.Lett. 73 (1994) 621-623 NYU-TH-94-04-01, BNL-60389 e-Print: hep-ph/9404333

[467] Renormalizable W selfenergy in the unitary gauge via the pinch technique Joannis Papavassiliou (New York U.), Alberto Sirlin (Brookhaven).

Apr 19, 1994. 15 pp. Published in Phys.Rev. D50 (1994) 5951-5957 BNL-60241 e-Print: hep-ph/9403378

[468] Observations concerning the magnitude of t anti-t threshold effects on electroweak parameters Bernd A. Kniehl (Hamburg U.), Alberto Sirlin (New York U.). Dec 1993. 11 pp. Published in Phys.Rev. D51 (1995) 3803-3810 DESY-93-194, NYU-TH-93-12-01 e-Print: hep-ph/9401243

[469] Radiative corrections to pi(lepton 2) decays William J. Marciano (Brookhaven), A. Sirlin (New York U.). Sep 1993. 11 pp. Published in Phys.Rev.Lett. 71 (1993) 3629-3632 NYU-TH-93-09-03

[470] Comparative analysis of three methods to evaluate vacuum polarization functions Bernd A. Kniehl (Wisconsin U., Madison), Alberto Sirlin (New York U.). Sep 1993. 7 pp. Published in Phys.Lett. B318 (1993) 367-370 MAD-PH-791, NYU-TH-93-09-02

[471] Relation between sin**2 Theta-w (m(z)) and sin**2 Theta-effective (leptonic) Paolo Gambino, Alberto Sirlin (New York U.). Sep 1993. 7 pp. Published in Phys.Rev. D49 (1994) 1160-1162 NYU-TH-93-09-07 e-Print: hep-ph/9309326

[472] Gauge invariant formulation of the S, T, and U parameters G. Degrassi (Padua U.), Bernd A. Kniehl (Hamburg U.), A. Sirlin (New York U.). Jun 1993. 9 pp. Published in Phys.Rev. D48 (1993) R3963-R3966 DESY-93-074, DFPD-93-TH-43, NYU-TH-93-06-05

[473] Incorporation of QCD effects in basic corrections of the electroweak theory Sergio Fanchiotti (CERN), Bernd A. Kniehl (Hamburg U.), Alberto Sirlin (New York U.). Dec 1992. 45 pp. Published in Phys.Rev. D48 (1993) 307-331 CERN-TH-6749-92, NYU-TH-92-12-05, CERN-TH.6749-92-AND-NYU-TH-92-12-05 e-Print: hep-ph/9212285

[474] On the effect of the tttt threshold on electroweak parameters Bernd A. Kniehl (DESY), Alberto Sirlin (New York U.). Sep 1992. 32 pp. Published in Phys.Rev. D47 (1993) 883-893 DESY-92-102, NYU-TR-92-09-04

[475] Gauge invariant selfenergies and vertex parts of the Standard Model in the pinch technique framework Giuseppe Degrassi, Alberto Sirlin (New York U.). May 1992. 33 pp. Published in Phys.Rev. D46 (1992) 3104-3116 NYU-TR-92-05-02

[476] Gauge dependence of basic electroweak corrections of the standard model Giuseppe Degrassi, Alberto Sirlin (New York U.). Jan 1992. 20 pp. Published in Nucl.Phys. B383 (1992) 73-92 NYU-TR-92-01-01

[477] Dispersion relations for vacuum polarization functions in electroweak physics Bernd A. Kniehl (Wisconsin U., Madison and DESY), Alberto Sirlin (New York U.). Sep 1991. 8 pp. Published in Nucl.Phys. B371 (1992) 141-148 DESY-91-103, MAD-PH-670

[478] Observations concerning mass renormalization in the electroweak theory A. Sirlin (Munich, Max Planck Inst.). Jun 1991. 3 pp. Published in Phys.Lett. B267 (1991) 240-242 MPI-PH-91-36

[479] Theoretical considerations concerning the Z0 mass A. Sirlin (New York U.). May 28, 1991. 9 pp. Published in Phys.Rev.Lett. 67 (1991) 2127-2130 NYU-TH-91-05-20

[480] Electromagnetic properties of neutrinos W.J. Marciano (Brookhaven), A. Sirlin (New York U.). 1992. 11 pp. Published in Camb.Monogr.Part.Phys.Nucl.Phys.Cosmol. 1 (1991) 229-239

[481] Effect of a fourth fermion generation on the m(t) upper bound S. Bertolini (Munich, Max Planck Inst.), A. Sirlin (Columbia U.). Nov 1990. 8 pp. Published in Phys.Lett. B257 (1991) 179-186 MPI-PAE-PTH-74-90

[482] Comparative analysis of electroweak corrections to e+ e- —¿ f anti-f in on-shell and (MS) frameworks Giuseppe Degrassi (Hannover U.), Alberto Sirlin (Munich, Max Planck Inst.). Jul 1990. 25 pp. Published in Nucl.Phys. B352 (1991) 342-366 MPI-PAE-PTH-48-90

[483] Relations Between the On-shell and Ms Frameworks and the M (WW) - M (ZZ) Interdependence G. Degrassi (Hannover U.), S. Fanchiotti, A. Sirlin (New York U.). May 1990. 21 pp. Published in Nucl.Phys. B351 (1991) 49-69 Print-90-0343 (NEW YORK)

[484] Accurate Determination of sin2Wsin2W (M (zz)) S. Fanchiotti, A. Sirlin (New York U.). Oct 31, 1989. 8 pp. Published in Phys.Rev. D41 (1990) 319 Print-89-0843 (NEW YORK)

[485] Effective Electromagnetic Form-factor of the Neutrino G. Degrassi, A. Sirlin (New York U.), W.J. Marciano (Brookhaven). 1989. 8 pp. Published in Phys.Rev. D39 (1989) 287-294

[486] Role of sin2W(mZ)sin2WmZ at the Z0Z0 Peak A. Sirlin (CERN). Aug 1989. 4 pp. Published in Phys.Lett. B232 (1989) 123-126 CERN-TH-5506-89

[487] Considerations Concerning the Renormalization of the Electroweak Sector of the Standard Model A. Sirlin (Valencia U.). Aug 1, 1989. 19 pp. Published in Nucl.Phys. B332 (1990) 20-38 FTUV/89-25

[488] (Hollik 79.) S. Jadach, M. Skrzypek, B.F.L. Ward, Phys. Lett. B 257, 173 (1991);

[489] (Hollik 81.) B.F.L. Ward, talk at ICHEP98 (PS1); B.F.L. Ward, S. Jadach. M.Melles, S.A Yost, hep-ph/9811245

[490] (Hollik 81.) B.F.L. Ward, S. Jadach. M.Melles, S.A Yost, hep- ph/9811245

[491] B.F.L. Ward, Renormalization Group Improved Yennie-Frautschi-Surra Theory, (ICTP, Trieste), Jul 1986, IC/86/211

[492] B.F.L. Ward, $Z^0 \to$ Lepton Anti-lepton Gamma, The Adler-Bell-Jackiw Anomaly Phenomenon and Heavy Quarkonium, (ICTP, Trieste), Sep 1984, IC/84/157.

[493] B.F.L. Ward, Z0 —¿ lepton anti-lepton gamma and heavy quarkonium. (Lockheed Martin, Palo Alto), Aug 1984, PRINT-84-0702 (LOCKHEED)

[494] Renormalization Group Improved Yennie-Frautschi-Surra Theory for Z0 Physics B.F.L. Ward (Tennessee U. and SLAC). Jun 1987. 26 pp. Published in Acta Phys.Polon. B19 (1988) 465 SLAC-PUB-4353

[495] Renormalization Group Improved Yennie-frautschi-Surra Theory B.F.L. Ward (ICTP, Trieste and Tennessee U.). May 1987. 29 pp. Published in Phys.Rev. D36 (1987) 939 Print-87-0537 (TENNESSEE), IC/86/211

[496] Renormalization group improved Yennie-Frautschi-Surra theory. (Addendum) B.F.L. Ward (ICTP, Trieste and Tennessee U.). 1987. 2 pp. Published in Phys.Rev. D42 (1990) 3249-3250

[497] Yfs2: The Second Order Monte Carlo for Fermion Pair Production at LEP / SLC With the Initial State Radiation of Two Hard and Multiple Soft Photons Stanislaw Jadach (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC). Dec 1988. 57 pp. Published in Comput.Phys.Commun. 56 (1990) 351-384 SLAC-PUB-4834, TPJU-15-88, UTHEP-88-0901

[498] Multi - Photon Monte Carlo for Bhabha Scattering at Low Angles Stanislaw Jadach (Jagiellonian U. and CERN and SLAC), B.F.L. Ward (Tennessee U. and SLAC). Nov 1988. 19 pp. Published in Phys.Rev. D40 (1989) 3582-3589 UTHEP-88-11-01

[499] New Approach to SU(2)LL U(1) Radiative Corrections in e+eee Annihilation Processes Near the Z0 Resonance S. Jadach (SLAC and Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC and ICTP, Trieste). Aug 1988. 5 pp. Published in Phys.Lett. B220 (1989) 611-615 IC-88-236-REV, UTHEP-88-020-REV

[500] NEW APPROACH TO HIGH-ENERGY SU(2)-L x U(1) RADIATIVE CORRECTIONS B.F.L. Ward (SLAC and Tennessee U.). Jul 1988. 23 pp. Published in Acta Phys.Polon. B20 (1989) 777-788 SLAC-PUB-4688, UTHEP-88-0801, C88-05-31 Invited talk given at Conference: C88-05-31

[501] New results on the precision of the LEP luminosity S. Jadach (CERN), M. Melles (Durham U.), B.F.L. Ward, S.A. Yost (Tennessee U.). 1999. 6 pp. Published in Acta Phys.Polon. B30 (1999) 1745-1750 Prepared for Conference: C99-01-05.3

[502] Initial final state interference in the Z line shape S. Jadach (DESY and Cracow, INP), B. Pietrzyk (Annecy, LAPP), E. Tournefier (CERN), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP). Jul 1999. 10 pp. Published in Phys.Lett. B465 (1999) 254-259 CERN-TH-99-217, LAPP-EXP-99-05 e-Print: hep-ph/9907547

[503] The Monte Carlo program KORALZ, for the lepton or quark pair production at LEP / SLC energies: From version 4.0 to version 4.04 S. Jadach (CERN and Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP). May 1999. 6 pp. Published in Comput.Phys.Commun. 124 (2000) 233-237 CERN-TH-99-119 e-Print: hep-ph/9905205

[504] Precision calculation of Bhabha scattering at LEP W. Placzek (Jagiellonian U. and CERN), S. Jadach (CERN and Cracow, INP), M. Melles (Durham U.), B.F.L. Ward (Tennessee U. and SLAC and CERN), S.A. Yost (Tennessee U.). Jan 1999. 10 pp. Published in In *Barcelona 1998, Radiative corrections: Application of quantum field theory to phenomenology* 325-333 CERN-TH-99-07, UTHEP-98-1101 Talk given at Conference: C98-09-08.2, p.325-333 Proceedings e-Print: hep-ph/9903381

[505] New results on the theoretical precision of the LEP / SLC luminosity B.F.L. Ward, S. Jadach, M. Melles, S.A. Yost (Tennessee U.). Sep 1998. 4 pp. Published in Phys.Lett. B450 (1999) 262-266 UTHEP-98-0501 Invited talk at Conference: C98-07-23 Proceedings e-Print: hep-ph/9811245

[506] Coherent exclusive exponentiation CEEX: The Case of the resonant e+ e- collision S. Jadach (CERN and Cracow, INP), B.F.L. Ward (CERN and Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP). Aug 1998. 13 pp. Published in Phys.Lett. B449 (1999) 97-108 CERN-TH-98-253, UTHEP-98-0801 e-Print: hep-ph/9905453

[507] Monte Carlo program KoralW 1.42 for all four-fermion final states in e+ e- collisions S. Jadach (CERN and Cracow, INP), W. Placzek (Jagiellonian U. and CERN), M. Skrzypek (CERN and Cracow, INP), B.F.L. Ward (CERN and Tennessee U. and SLAC), Z. Was (Cracow, INP and CERN). Jul 1998. 52 pp. Published in Comput.Phys.Commun. 119 (1999) 272-311 CERN-TH-98-242, UTHEP-98-0702 e-Print: hep-ph/9906277

[508] Final state radiative effects for the exact O(alpha) YFS exponentiated (un)stable W+ W- production at and beyond LEP-2 energies S. Jadach (Cracow, INP and CERN), W. Placzek (Jagiellonian U. and CERN), M. Skrzypek (Cracow, INP and CERN), B.F.L. Ward (Tennessee U. and SLAC and CERN), Z. Was (Cracow, INP and CERN). May 1998. 15 pp. Published in Phys.Rev. D61 (2000) 113010 UTHEP-502 e-Print: hep-ph/9907436

[509] Exact O (alpha) gauge invariant YFS exponentiated Monte Carlo for (un)stable W+ W- production at and beyond LEP-2 energies S. Jadach (Cracow, INP and CERN), W. Placzek (Tennessee U.), M. Skrzypek (Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (Cracow, INP and CERN). May 1997. 11 pp. Published in Phys.Lett. B417 (1998) 326-336 UTHEP-96-1101 e-Print: hep-ph/9705429

[510] e+ e- annihilation into hadrons at LEP-2 in the presence of the anomalous DESY positron - jet event phenomenon S. Jadach (CERN and Cracow, INP), B.F.L. Ward (CERN and Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP).

Mar 1997. 7 pp. Published in Phys.Lett. B408 (1997) 281-287 UTHEP-97-0102, CERN-TH-97-048, CERN-TH-97-48 e-Print: hep-ph/9704241

[511] Precise calculations of the Bhabha process B.F.L. Ward (Tennessee U. and SLAC and CERN), S. Jadach (Cracow, INP and CERN), M. Melles, W. Placzek (Tennessee U.), E. Richter-Was (Jagiellonian U. and Cracow, INP and CERN), M. Skrzypek, Z. Was (Cracow, INP and CERN), S.A. Yost (Tennessee U.). Oct 1996. 16 pp. Published in Acta Phys.Polon. B28 (1997) 925-942 CERN-TH-96-307, UTHEP-96-1001 Presented at Conference: C96-08-01

[512] Semianalytical third order calculations of the small angle Bhabha cross-sections S. Jadach (CERN and Cracow, INP), B.F.L. Ward (Tennessee U.). Sep 1996. 69 pp. Published in Acta Phys.Polon. B28 (1997) 1907-1979 CERN-TH-96-273, UTHEP-96-0901

[513] Soft pairs corrections to low angle Bhabha scattering: YFS Monte Carlo approach S. Jadach, M. Skrzypek (Tennessee U. and CERN), B.F.L. Ward (Tennessee U. and CERN and SLAC). Sep 1996. 24 pp. Published in Phys.Rev. D55 (1997) 1206-1215 CERN-TH-96-244, UTHEP-95-0601

[514] Upgrade of the Monte Carlo program BHLUMI for Bhabha scattering at low angles to version 4.04 S. Jadach (Cracow, INP and CERN), W. Placzek (Tennessee U.), E. Richter-Was (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (Cracow, INP). Jun 1996. 13 pp. Published in Comput.Phys.Commun. 102 (1997) 229-251 CERN-TH-96-158, UTHEP-96-0601A

[515] Missing third order leading log corrections in the small angle Bhabha calculation S. Jadach (Cracow, INP and CERN), B.F.L. Ward (Tennessee U. and SLAC), Phys.Lett. B389 (1996) 129-136 CERN-TH-96-156, UTHEP-96-0602

[516] Bhabha process at LEP: Theoretical calculations S. Jadach (Cracow, INP and CERN), M. Melles (Tennessee U.), B.F.L. Ward (Tennessee U. and SLAC), S.A. Yost (Tennessee U.). Jun 1996. 11 pp. Published in Nucl.Phys.Proc.Suppl. 51C (1996) 164-173 CERN-TH-96-176, UTHEP-96-0601, C96-04-21.1, UTHEP-96-0603 Presented at Conference: C96-04-21.1 Proceedings e-Print: hep-ph/9607358

[517] BHWIDE 1.00: O(alpha) YFS exponentiated Monte Carlo for Bhabha scattering at wide angles for LEP-1 / SLC and LEP-2 S. Jadach (Cracow, INP and CERN), W. Placzek (Tennessee U.), B.F.L. Ward (Tennessee U. and SLAC and CERN). Oct 1995. 14 pp. Published in Phys.Lett. B390 (1997) 298-308 UTHEP-95-1001 e-Print: hep-ph/9608412

[518] Gauge invariant YFS exponentiation of (un)stable W+ W- production at and beyond LEP-2 energies S. Jadach (Cracow, INP and CERN), W. Placzek (Tennessee U.), M. Skrzypek (Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC). Aug 1995. 17 pp. Published in Phys.Rev. D54 (1996) 5434-5442 UTHEP-95-0801 e-Print: hep-ph/9606429

[519] Precision calculation of the gamma - Z interference effect in the SLC / LEP luminosity process S. Jadach (Cracow, INP and CERN), W. Placzek (Tennessee U.), B.F.L. Ward (Tennessee U. and SLAC and CERN). Mar 1995. 19 pp. Published in Phys.Lett. B353 (1995) 349-361 CERN-TH-95-74, CERN-TH-95-074, UTHEP-95-0301

[520] Higher order radiative corrections to low angle Bhabha scattering: The YFS Monte Carlo approach S. Jadach (Cracow, INP and CERN), E. Richter-Was (Jagiellonian U. and CERN), B.F.L. Ward (Tennessee U. and SLAC and CERN), Z. Was (CERN and Cracow, INP). Feb 1995. 16 pp. Published in Phys.Lett. B353 (1995) 362-372, Erratum: Phys.Lett. B384 (1996) 488-491 CERN-TH-95-38, CERN-TH-95-038

[521] Exact results on O (alpha) corrections to the single hard bremsstrahlung process in low angle Bhabha scattering in the SLC / LEP energy regime S. Jadach, M. Melles, B.F.L. Ward, S.A. Yost (Tennessee U.). Jan 1995. 17 pp. Published in Phys.Lett. B377 (1996) 168-176 UTHEP-95-0101 e-Print: hep-ph/9603248

[522] Multiple photon Monte Carlo for polarized Moller scattering with Yennie-Frautschi-Surra exponentiation at high-energies S. Jadach (Cracow, INP and CERN), B.F.L. Ward (SLAC and Tennessee U.). Jul 1994. 11 pp. Published in Phys.Rev. D54 (1996) 743-749 UTHEP-94-0702

[523] The Monte Carlo program KORALZ, version 4.0, for the lepton or quark pair production at LEP / SLC energies S. Jadach (CERN and Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP). Nov 1993. 25 pp. Published in Comput.Phys.Commun. 79 (1994) 503-522 CERN-TH-7075-93

[524] BHLUMI4.00: YFS Monte Carlo approach to high precision low angle Bhabha scattering at LEP / SLC energies S. Jadach (Cracow, INP and CERN), E. Richter-Was (CERN and Jagiellonian U.), B.F.L. Ward (Tennessee U.), Z. Was (CERN and Cracow, INP). Jun 1994. 9 pp. UTHEP-94-0602

[525] The Monte Carlo program KORALZ, version 4.0, for the lepton or quark pair production at LEP / SLC energies S. Jadach (CERN and Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (CERN and Cracow, INP). Nov 1993. 25 pp. Published in Comput.Phys.Commun. 79 (1994) 503-522 CERN-TH-7075-93

[526] Theoretical expectations for high mass photon pairs in l+ l- gamma gamma events at LEP / SLC S. Jadach, B.F.L. Ward, S.A. Yost (Tennessee U.). Oct 1993. 9 pp. Published in Phys.Rev. D51 (1995) 3149-3152 UTHEP-93-1002 e-Print: hep-ph/9402350

[527] Higher order radiative corrections to Z0 and SSC physics: YFS Monte Carlo approach B.F.L. Ward, D. DeLaney, S. Jadach, Ch. Shio, G. Siop-

sis, M. Skrzypek (Tennessee U.), E. Richter-Was (Jagiellonian U.), Z. Was (CERN), S.A. Yost (Tennessee U.). Sep 1993. 28 pp. Published in Acta Phys.Polon. B25 (1994) 245-264 UTHEP-93-0901

[528] Soft pairs real and virtual infrared functions in QED S. Jadach (Tennessee U. and CERN), M. Skrzypek (Tennessee U. and Cracow, INP), B.F.L. Ward (Tennessee U. and CERN and SLAC). Mar 1993. 8 pp. Published in Phys.Rev. D49 (1994) 1178-1182 UTHEP-93-0301

[529] Role of A(LR) in high precision Z physics S. Jadach (Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC). Jan 1993. 13 pp. Published in Phys.Rev. D49 (1994) 5705-5708 UTHEP-93-0101

[530] Analytical results for low angle Bhabha scattering with pair production S. Jadach (Tennessee U. and CERN), M. Skrzypek (Tennessee U. and Cracow, INP), B.F.L. Ward (Tennessee U. and CERN and SLAC). Jul 1992. 20 pp. Published in Phys.Rev. D47 (1993) 3733-3741 UTHEP-92-0701

[531] Exact results on e+ e- —¿ e+ e- 2 gamma at SLC / LEP energies S. Jadach (Cracow, INP), B.F.L. Ward (Tennessee U. and SLAC), S.A. Yost (Tennessee U.). Jun 1992. 23 pp. Published in Phys.Rev. D47 (1993) 2682-2689 UTHEP-92-0601 e-Print: hep-ph/9211252

[532] On gauge invariance of the renormalized Z0 rest mass B.F.L. Ward (Tennessee U. and SLAC and CERN and ICTP, Trieste). May 1992. 4 pp. Published in Phys.Lett. B296 (1992) 209-212 IC-91-161

[533] On gauge invariance of the renormalized Z0 rest mass B.F.L. Ward (Tennessee U. and SLAC and CERN and ICTP, Trieste). 1992. 5 pp. Published in Nucl.Phys.Proc.Suppl. 29A (1992) 253-257

[534] Small angle Bhabha scattering B.F.L. Ward (Tennessee U. and CERN and SLAC), S. Jadach (CERN and Jagiellonian U.), E. Richter-Was (Jagiellonian U.), Z. Was (Cracow, INP). Nov 18, 1991. 5 pp. Published in Lepton/Photon Symp.1991:v.1:31-32 UTHEP-91-0902

[535] Final state multiple photon effects in fermion pair production at SLC / LEP S. Jadach (CERN and Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC). Sep 1991. 3 pp. Published in Phys.Lett. B274 (1992) 470-472 UTHEP-91-0903, TPJU-18-91

[536] QED multi - photon corrections to Bhabha scattering at low angles: Monte Carlo solution S. Jadach (CERN), E. Richter-Was (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC and CERN), Z. Was (Cracow, INP). Jun 1991. 10 pp. Published in Phys.Lett. B268 (1991) 253-262 CERN-TH-6118-91

[537] Higher order QED corrections to Bhabha scattering at low angles S. Jadach (CERN), E. Richter-Was (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (Cracow, INP and CERN). Feb 1991. 9 pp. Published in Phys.Lett. B260 (1991) 438-446 CERN-TH-5995-91, UTHEP-91-02-01

[538] High precision improved analytic exponentiation results for multiple photon effects in low angle Bhabha scattering at SLC and LEP S. Jadach (CERN and Jagiellonian U.), E. Richter-Was (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC and CERN), Z. Was (Cracow, INP and CERN). Jan 1991. 24 pp. Published in Phys.Rev. D44 (1991) 2669-2677 UTHEP-91-0101

[539] Complete standard model predictions for the muon forward - backward asymmetry at LEP Stanislaw Jadach (CERN), B.F.L. Ward (Tennessee U. and SLAC), Zbigniew Was (Cracow, INP and CERN). Dec 1990. 6 pp. Published in Phys.Lett. B257 (1991) 213-218 CERN-TH-5961-90

[540] Renormalization group improved YFS theory in Z0 physics S. Jadach (CERN and Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC). Oct 1990. 28 pp. Published in Acta Phys.Polon. B22 (1991) 229-246 UTHEP-90-1002, C90-06-02 Invited talk at Conference: C90-06-02 Proceedings

[541] Analytical O(alpha) distributions for Bhabha scattering at low angles S. Jadach (CERN), E. Richter-Was (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC), Z. Was (Cracow, INP and CERN). Oct 1990. 9 pp. Published in Phys.Lett. B253 (1991) 469-477 CERN-TH-5888-90, UTHEP-90-09-01

[542] Is there a better way of exponentiating QED corrections? S. Jadach (Jagiellonian U. and Tennessee U. and CERN), M. Skrzypek (Jagiellonian U.), B.F.L. Ward (Tennessee U. and SLAC). Aug 1990. 6 pp. Published in Phys.Lett. B257 (1991) 173-178 UTHEP-90-06-01, CERN-TH-5858-90

[543] MULTIPLE PHOTON EFFECTS IN ASYMMETRIES: mu anti-mu versus b anti-b S. Jadach (CERN and Jagiellonian U.), B.F.L. Ward (CERN and SLAC and Tennessee U.). Jan 1990. 27 pp. Published in Phys.Rev. D42 (1990) 1404-1408 UTHEP-90-0102

[544] Exact Results on e+e+ee + 2 in the Z0 Resonance Region S. Jadach (Jagiellonian U.), B.F.L. Ward (Tennessee U.), E. Was (Jagiellonian U.), H. Zhang (Tennessee U.). Dec 1989. 32 pp. Published in Phys.Rev. D42 (1990) 2977-2983 UTHEP-89-1201

[545] The Renormalization Group Improved YFS Method In QED, S. Jadach (CERN and Jagiellonian U.), B.F.L. Ward (CERN and SLAC and Tennessee U.). Oct 1989. 15 pp. Published in AIP Conf.Proc. 201 (1990) 201-215 UTHEP-89-1001, C89-05-22.2 Invited talk given at Conference: C89-05-22.2

[546] Exclusive Exponentiation In The Monte Carlo Yennie-frautschi-Surra Approach Stanislaw Jadach (Jagiellonian U. and CERN), B.F.L. Ward (Tennessee U. and SLAC). Jul 1989. 16 pp. Published in Conf.Proc. C890709 (1989) 325-340 UTHEP-89-0703, TPJU-19-89, C89-07-09 Contribution to Conference: C89-07-09

[547] Multi - Photon Effects In High Precision Electroweak Tests At Slc And Lep S. Jadach (CERN and Jagiellonian U.), B.F.L. Ward (SLAC and Tennessee U.). May 1989. 5 pp. Published in Nucl.Phys.Proc.Suppl. 13 (1990) 317-321 UTHEP-89-0501, C89-04-09

[548] (Hollik 6.) G. t Hooft, Nucl. Phys. B 33, 173 (1971);

[549] (Hollik 6.) G. t Hooft, Renormalizable Lagrangians for Massive Yang-Mills Fields Nucl.Phys. B35 (1971) 167-188,

[550] t Hooft, G. and M. J. G. Veltman, Regularization and Renormalization of Gauge Fields, Nucl. Phys. B 44, 189 (1972), doi:10.1016/0550-3213(72)90279-9.

[551] G. 't Hooft, M. Veltman, Proceedings, Colloquium on Renormalization of Yang-Mills Fields, Marseille, June 19-23, 1972, Conference: C72-06-22

[552] G. 't Hooft, The Renormalization procedure for Yang-Mills Fields, Utrecht U. Preprint 1972.

[553] Gerard 't Hooft, M.J.G. Veltman, Combinatorics of gauge fields, Nucl.Phys. B50 (1972) 318-353,

[554] Gerard 't Hooft, Dimensional regularization and the renormalization group (CERN). May 1973. 14 pp. Published in Nucl.Phys. B61 (1973) 455-468;

[555] Gerard 't Hooft, An algorithm for the poles at dimension four in the dimensional regularization procedure, Nucl.Phys. B62 (1973) 444-460;

[556] Gerard 't Hooft, M.J.G. Veltman, Diagrammar, NATO Sci.Ser.B 4 (1974) 177-322; CERN-73-09, Conference: C73-08-14 Proceedings

[557] Gerard 't Hooft, M.J.G. Veltman, Scalar One Loop Integrals, Nucl.Phys. B153 (1979) 365-401; PRINT-79-0134 (UTRECHT);

[558] (Hollik 7.) G. Passarino, M.J.G. Veltman, One Loop Corrections for e^+e^- Annihilation Into $\mu^+\mu^-$ in the Weinberg Model, Nucl.Phys. B160 (1979) 151-207

[559] (Hollik 19.) G. Passarino, M. Veltman, Phys. Lett. B 237, 537 (1990)

[560] (Hollik 23.) M. Veltman, Phys. Lett. B 91, 95 (1980);

[561] (Hollik 23.) M. Green, M. Veltman, Nucl. Phys. B 169, 137 (1980)

[562] (Hollik 23.) M. Green, M. Veltman, Nucl. Phys. B 175, 547 (1980);

[563] (Hollik 43.) D. Ross, M. Veltman, Nucl. Phys. B 95, 135 (1975)

[564] (Hollik 44.) M. Veltman, Nucl. Phys. B 123, 89 (1977);

[565] (Hollik 49.) M. Veltman, Acta Phys. Polon. B 8, 475 (1977)

[566] (Hollik 50.) J.J. van der Bij, M. Veltman, Nucl. Phys. B 231, 205 (1985)

[567] M. Einhorn, D. Jones and M. Veltman, Nucl. Phys. B191 (1981) 146;

[568] M.J.G. Veltman, An IBM-7090 Program For Symbolic Evaluation Of Algebraic Expressions, Especially Feynman Diagrams CERN PRINT-65-879

[569] M.J.G. Veltman, Algebraic techniques, Comput.Phys.Commun. 3 (1972) 75-78;

[570] M.J.G. Veltman, Limit on Mass Differences in the Weinberg Model, Nucl.Phys. B123 (1977) 89-99; Print-77-0151 (UTRECHT)

[571] M.J.G. Veltman, Radiative Corrections To Weak And Electromagnetic Processes, Conference: C79-07-09.1, p.1-27;

[572] M. Lemoine, M.J.G. Veltman, Radiative Corrections to $e^+e^- \to W^+W^-$ in the Weinberg Model, Nucl.Phys. B164 (1980) 445-483; PRINT-79-0457 (UTRECHT);

[573] (Hollik 128.) M. Hayakawa, T. Kinoshita, A.I. Sanda, Phys. (1997)

[574] (Hollik 129.) M. Hayakawa, T. Kinoshita, Phys. Rev. D 57, 7267 (1997)

[575] (Hollik 131.) T. Kinoshita, B. Nizic, Y. Okamoto, Phys. Rev. D 31, 2108 (1985);

[576] (Hollik 131.) T. Kinoshita, W. Marciano, in: Quantum Electrodynamics, ed. T. Kinoshita, World Scientific 1990 (p. 419)

[577] (Hollik 132.) T. Kinoshita, Phys. Rev. Lett. 75, 4728 (1995); [574] (Hollik 129.) M. Hayakawa, T. Kinoshita, Phys. Rev. D 57, 7267 (1997).

[578] T. Kinoshita, Theory Of Lepton Anomalous Magnetic Moments, 1947 - 1983 Conference: C83-06-01.1, p.278-297 (1986)

[579] T. Kinoshita and J.R. Sapirstein, New Developments In QED, Aug 1984, CLNS-84/617, Conference: C84-07-23.3

[580] T. Kinoshita, B. Nizic, Y. Okamoto, Hadronic Contributions to the Anomalous Magnetic Moment of the Muon, Phys.Rev. D31 (1985) 2108, CLNS-84-606,

[581] T. Kinoshita, B. Nizic, Y. Okamoto, Improved Theory of the Muon Anomalous Magnetic Moment, Phys.Rev.Lett. 52 (1984) 717, CLNS-83/592,

[582] T. Kinoshita, Status of G2 calculation for the electron and muon, AIP Conf.Proc. 95 (1983) 281-288, CLNS-82-551, Conference: C82-09-16 Proceedings

[583] T. Kinoshita, W.B. Lindquist, Eighth Order Magnetic Moment of the Electron. 5: Diagrams Containing No Vacuum Polarization Loop, Phys.Rev. D42 (1990) 636-655, CLNS-81-510, CLNS-89-980

[584] T. Kinoshita, W.B. Lindquist, Eighth Order Magnetic Moment of the Electron. 4: Vertex Diagrams Containing Photon - Photon Scattering Subdiagrams, Phys.Rev. D39 (1989) 2407, CLNS-81-509,

[585] T. Kinoshita, W.B. Lindquist, Eighth Order Anomalous Magnetic Moment of the electron, Phys.Rev.Lett. 47 (1981) 1573, CLNS-81/512,

[586] T. Kinoshita, W.B. Lindquist, Eighth Order Magnetic Moment of the Electron. 3: Sixth Order Vertices Containing a Second Order Vacuum Polarization Subdiagram, Phys.Rev. D27 (1983) 886, CLNS-81/508,

[587] T. Kinoshita, W.B. Lindquist, Calculation Of The Eighth Order Anomalous Magnetic Moment Of The Electron (1981) CERN-TH-3093, C81-06-08-

5

[588] T. Kinoshita, High Precision Test Of QED And Determination Of Alpha , 1981, Conference: C81-11-16, p.423-441

[589] T. Kinoshita, Anomalous Magnetic Moment Of An Electron And High Precision Test Of Quantum Electrodynamics, Oct 1979, CLNS-79-437, C79-07-05.1-1, Conference: C79-07-05.1 (Marseille Collog.1979:141), p.141

[590] T. Kinoshita, W.B. Lindquist, Eighth Order Magnetic Moment of the Electron. 2.: Fourth Order Vertices Containing Second and Fourth Order Vacuum Polarization Subdiagrams, Phys.Rev. D27 (1983) 877, CLNS-426,

[591] T. Kinoshita, W.B. Lindquist, Eighth Order Magnetic Moment of the Electron. 1.: Second Order Vertex Containing Second, Fourth and Sixth Order Vacuum Polarization Subdiagrams, Phys.Rev. D27 (1983) 867, CLNS-424,

[592] T. Kinoshita, W.B. Lindquist, Parametric Formula for the Sixth Order Vacuum Polarization Contribution in Quantum Electrodynamics, Phys.Rev. D27 (1983) 853, CLNS-423,

[593] T. Kinoshita, W.B. Lindquist, Improving the Theoretical Prediction of the electron Anomalous Magnetic Moment: Progress Report, Oct 1977. 12 pp., CLNS-374

[594] T. Kinoshita, A. Ukawa, Structure of Leading Infrared Divergences in Nonabelian Gauge Theories, Phys.Rev. D16 (1977) 332, CLNS-358,

[595] T. Kinoshita, A. Ukawa, Power Counting Theorem for Infrared Logarithms in Nonabelian Gauge Theories, Phys.Rev. D15 (1977) 1596, CLNS-349,

[596] T. Kinoshita, A. Ukawa, New Approach to the Singularities of Feynman Amplitudes in the Zero Mass Limit, Phys.Rev. D13 (1976) 1573, CLNS-322,

[597] T. Kinoshita, A. Ukawa, Mass Singularities of Feynman Amplitudes, 1975 Conference: C75-01-23, p.55-58

[598] Predrag Cvitanovic, Toichiro Kinoshita, Sixth Order Magnetic Moment of the electron, Phys.Rev. D10 (1974) 4007, SLAC-PUB-1427,

[599] Predrag Cvitanovic, Toichiro Kinoshita, New Approach to the Separation of Ultraviolet and Infrared Divergences of Feynman - Parametric Integrals, Phys.Rev. D10 (1974) 3991, SLAC-PUB-1403,

[600] T. Kinoshita, P. Cvitanovic, Feynman-Dyson rules in parametric space, Phys.Rev. D10 (1974) 3978-3991,

[601] T. Kinoshita, P. Cvitanovic, Sixth-order radiative corrections to the electron magnetic moment, Phys.Rev.Lett. 29 (1972) 1534-1537,

[602] S.J. Brodsky and T. Kinoshita, Vacuum polarization contributions to the sixth order anomalous magnetic moment of the muon and electron, Phys.Rev. D3 (1971) 356-362,

[603] S.J. Brodsky and T. Kinoshita, Theoretical results for sixth order contributions to the anomalous magnetic moment of the muon and electron, Jul 1970. 17 pp., CLNS-116

[604] J. Aldins, S.J. Brodsky and T. Kinoshita, A.J. Dufne, Photon - Photon Scattering Contribution To The Sixth Order Magnetic Moments Of The Muon And Electron, Phys.Rev. D1 (1970) 2378, SLAC-PUB-0701,

[605] J. Aldins, S.J. Brodsky and T. Kinoshita, A.J. Dufne, Photon - Photon Scattering Contribution To The Sixth Order Magnetic Moment Of The Muon , Phys.Rev.Lett. 23 (1969) 441-443, SLAC-PUB-0635,

[606] T.K. Kinoshita, The anomalous magnetic moment of the muon, Cargese Lect.Phys. 2 (1968) 209-244, Conference: C67-09-00 Proceedings

[607] T.K. Kinoshita, R.J. Oakes, Hadronic contributions to the muon magnetic moment, Phys.Lett. 25B (1967) 143-145,

[608] T.K. Kinoshita, Mass singularities of Feynman amplitudes, J.Math.Phys. 3 (1962) 650-677,

[609] T.K. Kinoshita, Radiative corrections to pi - e decay, Phys.Rev.Lett. 2 (1959) 477,

[610] Theory of the muon anomalous magnetic moment Toichiro Kinoshita (Cornell U., LNS), William J. Marciano (Brookhaven). Jul 14, 1990. 60 pp. Published in Adv.Ser.Direct.High Energy Phys. 7 (1990) 419-478 CLNS-90-983

[611] (Hollik 15.) M. Bohm, W. Hollik, H. Spiesberger, Fortschr. Phys. 34, 687 (1986)

[612] (Hollik 16.) W. Hollik, Fortschr. Phys. 38, 165 (1990)

[613] (Hollik 17.) M. Consoli, W. Hollik, F. Jegerlehner, in: Z Physics at LEP 1, eds. G. Altarelli, R. Kleiss and C. Verzegnassi, CERN 89-08 (1989)

[614] (Hollik 56.) M. Consoli, W. Hollik, F. Jegerlehner, Phys. Lett. B 227, 167 (1989)

[615] (Hollik 64.) W. Hollik, B. Krause, A. Stremplat, G. Weiglein, to appear (1999);

[616] (Hollik 68.) A. Denner, W. Hollik, B. Lampe, Z. Phys. C 60, 193 (1993)

[617] (Hollik 92.) W. de Boer, A. Dabelstein, W. Hollik, W. Mosle, U. Schwickerath, Z. Phys. C 75, 627 (1997)

[618] S. Heinemeyer, W. Hollik, G. Weiglein, Phys. Rev. D 58, 091701 (1998); hep-ph/9807423 (Phys. Lett. B, to appear)

[619] (Hollik 136.) A. Denner, R. Guth, W. Hollik, J.H. Kühn, Z. Phys. C 51, 695 (1991);

[620] (Hollik 138.) P. Chankowski, A. Dabelstein, W. Hollik, W. Mo sle, S. Pokorski,

[621] W. Hollik, Phys.Lett. B152 (1985) 121; certain of his Z-pole numerical results were confirmed by [682]; His 1984 DESY 84-075 preprint appeared after [682]'s work was finished. Hollik says the same thing.

[622] M. Bohm, Ansgar Denner, W. Hollik, Radiative Corrections to Bhabha Scattering at High-Energies. 1.: Virtual and Soft Photon Corrections Nucl.Phys. B304 (1988) 687-711, DESY-86-165, December 1986,

[623] W. Hollik, Standard And Nonstandard Higgs Bosons In Electroweak Radiative Corrections,

DESY preprint, Aug 1986, DESY-86-092, Presented at Conference: C86-05-26.1 (Warsaw Sympos.1986:0303) Proceedings

[624] M. Bohm, H. Spiesberger W. Hollik, On the One Loop Renormalization of the Electroweak Standard Model and Its Application to Leptonic Processes, Fortsch.Phys. 34 (1986) 687-751,

[625] W. Hollik, H.J. Timme, Renormalization Scheme Dependence of Electroweak Radiative Corrections, Z.Phys. C33 (1986) 125, DESY-85-099

[626] W. Hollik, Weak Corrections to Polarization and Charge Asymmetries in $e^+e^- \to \mu^+\mu^-$ Around the Z^0, Phys.Lett. 152B (1985) 121-125, DESY-84-075,

[627] M. Bohm, Ansgar Denner, W. Hollik, R. Sommer, Radiative Corrections to Bhabha Scattering in SU(2) X U(1), Phys.Lett. 144B (1984) 414

[628] M. Bohm and W. Hollik, Electroweak Radiative Corrections to the $e^+e^- \to \mu^+\mu^-$ Asymmetry, Phys.Lett. 139B (1984) 213-216

[629] R. Sommer, M. Bohm, W. Hollik, Radiative Corrections To Bhabha Scattering and the Determination Of The Electroweak Parameters, Print-83-0526 (WURZBURG)

[630] W. Hollik, Radiative Corrections To Final State Polarizations In Electron Positron Annihilation, Wurzburg U. preprint April 1983, PRINT-83-0312

[631] W. Hollik, Electromagnetic Radiative Corrections In Polarized e^+e^- Annihilation, Hamburg U. preprint Aug. 1983, Published in In *Trieste 1983, Proceedings, Radiative Corrections In $SU(2)_L \times U(1)_Y$ 123-137

[632] W. Hollik, Higher Order QED Contributions To Polarized Bhabha Scattering, Wurzburg U. preprint Nov 1982. 6 pp. Phys.Lett. 123B (1983) 259-264

[633] M. Bohm, W. Hollik, Radiative Corrections to Polarized e^+e^- Annihilation in the Standard Electroweak Model, Nucl.Phys. B204 (1982) 45-77

[634] W.F.L. Hollik, Radiative Corrections in the Standard Model and their Role for Precision Tests of the Electroweak Theory, Fortsch.Phys. 38 (1990) 165-260, DESY-88-188,

[635] Wim Beenakker, Wolfgang Hollik, The Width of the Z Boson, Z.Phys. C40 (1988) 141, DESY-88-007,

[636] Radiative Corrections to Bhabha Scattering at High-Energies. 2. Hard Photon Corrections and Monte Carlo Treatment Frits A. Berends, R. Kleiss (Leiden U.), W. Hollik (Hamburg U.). Aug 1987. 37 pp. Published in Nucl.Phys. B304 (1988) 712-748 DESY-87-094

[637] Precision tests of the standard model W. Hollik (Karlsruhe U.). 1999. 19 pp. Published in Acta Phys.Polon. B30 (1999) 1787-1805 Prepared for Conference: C99-01-05.3; Summary of 1998 conference

[638] Status of the standard model: Review W. Hollik (CERN and Karlsruhe U.). Sep 1998. 23 pp. Published in In *Barcelona 1998, Radiative corrections: Application of quantum field theory to phenomenology* 44-66 KA-TP-21-1998 Talk given at Conference: C98-09-08.2,

[639] Precision tests of the electroweak theory W. Hollik (Karlsruhe U.). 1997. 35 pp. Published in J.Phys. G23 (1997) 1503-1537

[640] Electroweak radiative corrections after the top quark discovery W. Hollik (Karlsruhe U.). Aug 8, 1997. 64 pp. Published in Adv.Ser.Direct.High Energy Phys. 15 (1998) 1-64 KA-TP-12-1997

[641] Electroweak interactions: A Theoretical overview W. Hollik (Karlsruhe U.). Jun 1997. 11 pp. Published in Nucl.Phys.Proc.Suppl. 66 (1998) 35-44 KA-TP-14-1997 Talk given at Conference: C97-06-22.1 Proceedings e-Print: hep-ph/9708339

[642] Precision observables in SU(2) x U(1) models with an additional Higgs triplet T. Blank, W. Hollik (Karlsruhe U.). Mar 1997. 24 pp. Published in Nucl.Phys. B514 (1998) 113-134 KA-TP-3-1997 e-Print: hep-ph/9703392

[643] Review of electroweak theory W. Hollik (Karlsruhe U.). Jul 1996. 6 pp. KA-TP-23-1996, C96-07-25 Talk given at Conference: C96-07-25 (ICHEP 96:1007-1012), p.1007-1012 Proceedings e-Print: hep-ph/9610457 1996 includes top-quark discovered

[644] Electroweak radiative corrections to resonant charged gauge boson production Doreen Wackeroth (Fermilab), Wolfgang Hollik (Karlsruhe U.). Jun 1996. 48 pp. Published in Phys.Rev. D55 (1997) 6788-6818 FERMILAB-PUB-96-094-T, KA-TP-12-1996 e-Print: hep-ph/9606398

[645] Top pair production in e+ e- collisions with virtual and real electroweak radiative corrections V. Driesen, W. Hollik, A. Kraft (Karlsruhe U.). Mar 1996. 8 pp. Published in In *Annecy/Assergi/Hamburg 1995, e+ e- collisions at TeV energies, pt. B* 33-40 KA-TP-6-1996, C95-02-04, C95-06-02, C95-08-30 To be published in the proceedings of Conference: C95-08-30 (e+ e- Linear Collisions 1995:33-40), p.33-40, To be published in the proceedings of Conference: C95-06-02 (e+ e- Linear Collisions 1995:33-40), p.33-40, To be published in the proceedings of Conference: C95-02-04 (e+ e- Linear Collisions 1995:33-40), p.33-40 Proceedings e-Print: hep-ph/9603398

[646] Higgs mass prediction W. Hollik (Karlsruhe U.). Mar 1996. 11 pp. Published in In *Padua 1996, Hadron collider physics* 489-498 KA-TP-19-1996, C96-05-26.2 Invited talk at Conference: C96-05-26.2, p.489-498 Proceedings e-Print: hep-ph/9608325

[647] Precision tests of the electroweak interaction Wolfgang Hollik (Karlsruhe U.). Jun 1995. 16 pp. Published in In *Cracow 1995, Physics in collision* 155-171 KA-TP-6-1995, C95-06-08 Invited talk at Conference: C95-06-08 (Physics in Collision 1995:0155-172), p.0155-172 Proceedings e-Print: hep-ph/9507406

[648] Electroweak precision observables: An Indi-

rect access to the top quark Wolfgang Hollik (Karlsruhe U.). Dec 1994. 8 pp. Published in In *Bad Honnef 1994, Heavy quark physics* 47-54 KA-THEP-2-1995, C94-12-14 Talk given at Conference: C94-12-14 (We-Heraeus Seminar 1994:0047-54), p.0047-54 Proceedings e-Print: hep-ph/9503410

[649] The Z B anti-B vertex: Implications for the Standard Model and beyond F. Cornet (Granada U., Theor. Phys. Astrophys.), W. Hollik (Karlsruhe U.), W. Mosle (Munich, Max Planck Inst.). Mar 1994. 21 pp. Published in Nucl.Phys. B428 (1994) 61-76 MPI-PHT-94-13

[650] Electroweak one loop contributions to top pair production in hadron colliders W. Beenakker (DESY), Ansgar Denner (CERN), W. Hollik (Bielefeld U. and Munich, Max Planck Inst.), R. Mertig (Leiden U.), T. Sack (Munich, Max Planck Inst. and Siemens, Munich), D. Wackeroth (Munich, Max Planck Inst.). May 1993. 30 pp. Published in Nucl.Phys. B411 (1994) 343-380 MPI-PH-93-20

[651] O(G-mu(2) m-t(4)) Electroweak radiative corrections to the Z b anti-b vertex Ansgar Denner (CERN), W. Hollik (Bielefeld U. and Munich, Max Planck Inst.), B. Lampe (Munich, Max Planck Inst.). Apr 1993. 14 pp. Published in Z.Phys. C60 (1993) 193-198 CERN-TH-6874-93 e-Print: hep-ph/9305273

[652] Higgs boson effects in e+ e- —¿ t anti-t close to the threshold Wim Beenakker (CERN), Wolfgang Hollik (Munich, Max Planck Inst.). Jul 1991. 7 pp. Published in Phys.Lett. B269 (1991) 425-431 CERN-TH-6185-91

[653] e+ e- annihilation into heavy fermion pairs at high-energy colliders W. Beenakker, S.C. van der Marck (Leiden U.), W. Hollik (Munich, Max Planck Inst.). Mar 1991. 55 pp. Published in Nucl.Phys. B365 (1991) 24-78 MPI-PAE-PTH-12-91

[654] Bhabha scattering with higher order weak loop corrections Dmitri Yu. Bardin (Dubna, JINR), W. Hollik, T. Riemann (Munich, Max Planck Inst.). Jun 1990. 19 pp. Published in Z.Phys. C49 (1991) 485-490 MPI-PAE-PTH-32-90, PHE-90-09

[655] Electroweak Radiative Corrections In Deep Inelastic Electron - Proton Scattering W. Hollik (CERN). Sep 1989. 20 pp. Published in NATO Sci.Ser.B 233 (1990) 467-486 CERN-TH-5547/89 Presented at Conference: C89-07-09 (Brighton Workshop 1989:0467-486), Conference: C87-10-12

[656] Electroweak Radiative Corrections Wolfgang Hollik (CERN). Sep 1989. 3 pp. Published in Nucl.Phys.Proc.Suppl. 16 (1990) 194-196 PRINT-89-0876 (CERN), C89-09-06 Presented at Conference: C89-09-06

[657] Z Line Shape Dmitri Yu. Bardin, Mikhail S. Bilenky (Dubna, JINR and Dubna, JINR), W. Beenakker, Frits A. Berends, W.L. van Neerven, S. van der Marck (Leiden U.), G. Burgers (NIKHEF, Amsterdam), W. Hollik (CERN), T. Riemann, M. Sachwitz (DESY, Zeuthen). Jul 1989. 41 pp. CERN-TH-5468-89 Conference: C89-02-20.1, p.89-127

[658] The Effect of the Top Quark on the M(W)-M(Z) Interdependence and Possible Decoupling of Heavy Fermions from Low-Energy Physics M. Consoli, W. Hollik (CERN), F. Jegerlehner (PSI, Villigen). May 1989. 4 pp. Published in Phys.Lett. B227 (1989) 167-170 CERN-TH-5395/89

[659] Electroweak Radiative Corrections W. Hollik (CERN). 1989. 3 pp. Published in Nucl.Phys.Proc.Suppl. 16 (1990) 194-196

[660] W. Hollik, E. Kraus and D. Stockinger, Eur. Phys. J. C 11 (1999) 365 [arXiv:hep- ph/9907393].

[661] W. Hollik and D. Stockinger, Eur. Phys. J. C 20 (2001) 105 [arXiv:hep-ph/0103009].

[662] W. Hollik, E. Kraus and D. Stockinger, Eur. Phys. J. C 23 (2002) 735 [arXiv:hep- ph/0007134].

[663] W. Hollik, E. Kraus, M. Roth, C. Rupp, K. Sibold D. StockingerNucl. Phys. B 639 (2002) 3 [arXiv hep-ph 02041350]. Algebraic renormalization of SUSY QED, SUSY QCD, the electro-weak SM, etc. are referenced there.

[664] Timo van Ritbergen, Robin G. Stuart, "On the precise determination of the Fermi coupling constant from the muon lifetime", Nucl.Phys. B564 (2000) 343-390 TTP-99-18, UM-TH-99-04, April 1999. 48 pp.; e-Print: hep-ph/9904240;

[665] (Hollik 52.) T. van Ritbergen, R. Stuart, hep-ph/9802341;

[666] (Hollik 52.) T. van Ritbergen, R. Stuart, hep-ph/9808283

[667] (Hollik 58.) B.A. Kniehl, J.H. Kuhn, R.G. Stuart, Phys. Lett. B 214, 621 (1988);

[668] G.L. Kane, R.G. Stuart, J.D. Wells, Phys. Lett. B 354, 350 (1995);

[669] M. Drees et al., Phys. Rev. D 54, 5598 (1996)

[670] R.G. Stuart, Oxford University D.Phil. Thesis 1985, Rutherford Appleton Laboratory RAL T-008-1985; published in [682] (C3).

[671] D.C. Kennedy, B.W. Lynn, C.J.-C Im and R.G. Stuart, EXPOSTAR, Nucl. Phys. 321B (1989) 83;

[672] D. Levinthal, F. Bird, R.G. Stuart and B.W. Lynn, Z.Phys. C53 (1992) 617-628; CERN-TH-6094-91-REV, CERN-TH-6094-91, SU-ITP-898-91;

[673] D. Levinthal and F. Bird, B.W. Lynn and R.G. Stuart, "1990 ALEPH-LEP1 rapidity and acollinearity data fit with EXPOSTAR", ALEPH Note 90-033 [671];

[674] D. Levinthal and F. Bird, B.W. Lynn and R.G. Stuart; "1990/1991 ALEPH-LEP1 rapidity data fit with EXPOSTAR", ALEPH Note 92-147 [671];

[675] D. Levinthal and F. Bird, B.W. Lynn and R.G. Stuart, "1990/1991 ALEPH-LEP1 acollinearity data fit with EXPOSTAR [671]; 1992 private communication to then-ALEPH-spokesman J. Le Francois;

[676] B.W. Lynn, M.E. Peskin and R.G. Stuart, "RADIATIVE CORRECTIONS IN SU(2) x U(1):

LEP / SLC", published in [178, 746] Ellis, J. (Ed.): Peccei, R.d. (Ed.): Physics At Lep, Vol. 1*, 90-152; LEP study group Precision Tests of the Standard Model at the Z^0 , 19 March 1985; Published in [746]; SLAC-PUB-3725 (1985), Jul 1985. 86 pp; First identified "oblique" HP-EW-QL and first showed LEP/SLC sensitivity to BSM physics (i.e. Technicolor, heavy quarks and leptons, N=1 SUSY squarks and sleptons, N=1 SUSY gauginos and Higgsinos, etc.).

[677] B. Grzadkowski, Johann H. Kuhn, P. Krawczyk and R.G. Stuart, "One Loop Electroweak Corrections to Polarization Asymmetries on the Toponium Resonance", Phys.Lett. B176 (1986) 456; MPI-PAE-PTH-07-86, C86-07-16; Contributed to Conference: C86-07-16 Proceedings;

[678] R.J. Cashmore, C.M. Hawkes, B.W. Lynn and R.G. Stuart, "The Forward - Backward Asymmetry in $e^+e^- \to \mu^+\mu^-$: Comparisons Between the Theoretical Calculations at the One Loop Level in the Standard Model and With the Experimental Measurements", Z.Phys. C30 (1986) 125-134; OXFORD-NP-45-85;

[679] B. Grzadkowski, P. Krawczyk, Johann H. Kuhn and R.G. Stuart, "Precision Tests of the Standard Model on the Toponium Resonance", Phys.Lett. 163B (1985) 247-249; CERN-TH-4226;

[680] B. Grzadkowski, P. Krawczyk, Johann H. Kuhn and R.G. Stuart, "Higgs Mass Effects In The Longitudinal Polarization Asymmetry On The Toponium Resonance", 1985 Conference: C85-06-10.1, p.455-457;

[681] B.W. Lynn and R.G. Stuart, "Renormalization Of QED In An Almost Arbitrary Gauge", Oxford U. preprint Oct 1983, OXFORD-TP-50/83;

[682] B.W. Lynn, R.G. Stuart, "Standard Model Electroweak Radiative Corrections to Longitudinal Polarization Asymmetry A_{LR} and Forward-Backward Asymmetry A_{FB} in $e^+e^- \to \mu^+\mu^-$ on and off the Z0 Resonance", Nucl.Phys. B253 (1985) 216-230; IC/84/46 ICTP preprint April 1984;

[683] Robin G. Stuart, "The Calculation Of Electroweak Radiative Corrections On The Toponium Resonance", Acta Phys.Polon. B19 (1988) 387; MPI-PAE/PTh-77/87, Sep 1987. 19 pp.; Invited talk given at Conference: C87-06-03;

[684] Johann H. Kuhn, Robin G. Stuart, "Compact Form for the Contribution From ZZ Box Diagrams in e+eee Annihilation", Phys.Lett. B200 (1988) 360-362; MPI-PAE/PTh-53/87, Jul 1987. 3 pp.;

[685] Bernd A. Kniehl, Johann H. Kuhn, R.G. Stuart, "QCD Corrections, Virtual Heavy Quark Effects and Electroweak Precision Measurements", Phys.Lett. B214 (1988) 621-629 MPI-PAE/PTh-36/88, Jun 1988. 9 pp.;

[686] Bernd A. Kniehl, M. Krawczyk, Johann H. Kuhn, R.G. Stuart, "Hadronic Contributions to O (22) Radiative Corrections in e+eee Annihilation" Phys.Lett. B209 (1988) 337-342 MPI-PAE/PTh-93/87, Jan 1988. 6 pp.;

[687] Robin G. Stuart , "Algebraic Reduction of One Loop Feynman Diagrams to Scalar Integrals" Comput.Phys.Commun. 48 (1988) 367-389 MPI-PAE/PTh-85/87, Oct 1987. 40 pp.;

[688] Robin G. Stuart, "The Calculation Of Electroweak Radiative Corrections On The Toponium Resonance" Acta Phys.Polon. B19 (1988) 387 MPI-PAE/PTh-77/87, (Munich, Max Planck Inst.). Sep 1987. 19 pp.; Invited talk given at Conference: C87-06-03;

[689] S. Jadach, Johann H. Kuhn, R.G. Stuart, Z. Was, "QCD and QED Corrections to the Longitudinal Polarization Asymmetry" Z.Phys. C38 (1988) 609, Erratum: Z.Phys. C45 (1990) 528 MPI-PAE-PTH-71-87, Sep 1987. 28 pp.;

[690] Johann H. Kuhn, Robin G. Stuart , "Compact Form for the Contribution From ZZ Box Diagrams in $e^+e^- \to e^+e^-$ Annihilation Phys.Lett. B200 (1988) 360-362; MPI-PAE/PTh-53/87, Jul 1987. 3 pp.;

[691] A. Gongora, R.G. Stuart, "Complete $\mathcal{O}(\alpha)$ Corrections to Polarized Compton Scattering" Z.Phys. C42 (1989) 617 MPI-PAE/PTh-55/87, Jul 1987. 24 pp.;

[692] Johann H. Kuhn, Robin G. Stuart, "Heavy Quarks And Their Influence On The Polarization Asymmetry" Phys.Lett. B190 (1987) 208-210 MPI-PAE/PTh 2/87, Jan 1987. 3 pp.;

[693] B. Grzadkowski, Johann H. Kuhn, P. Krawczyk, R.G. Stuart, "Electroweak Corrections on the Toponium Resonance" Nucl.Phys. B281 (1987) 18-40 MPI-PAE/PTh 29/86, Jul 25, 1986. 23 pp.;

[694] B. Grzadkowski, Johann H. Kuhn, P. Krawczyk, R.G. Stuart, "One Loop Electroweak Corrections to Polarization Asymmetries on the Toponium Resonance" Phys.Lett. B176 (1986) 456 MPI-PAE-PTH-07-86, C86-07-16, Feb 1986. 7 pp.;

[695] Robin G. Stuart, "The MS and On-shell Renormalization Schemes in the Analysis of Neutrino Scattering Experiments", Z.Phys. C34 (1987) 445 CERN-TH-4342/85, Nov 1985. 15 pp.;

[696] Timo van Ritbergen, Robin G. Stuart, "Complete two loop quantum electrodynamic contributions to the muon lifetime in the Fermi model" Phys.Rev.Lett. 82 (1999) 488-491 UM-TH-98-15, Aug 1998. 5 pp.; e-Print: hep-ph/9808283

[697] Robin G. Stuart, "An Improved determination of the Fermi coupling constant G_F", Presented at Conference: C99-01-05; e-Print: hep-ph/9902257, Jan 1999. 6 pp.

[698] Timo van Ritbergen, Robin G. Stuart; "Complete two loop quantum electrodynamic contributions to the muon lifetime in the Fermi model", Phys.Rev.Lett. 82 (1999) 488-491 UM-TH-98-15, Aug 1998. 5 pp.; e-Print: hep-ph/9808283;

[699] O(N(f) alpha**2) electromagnetic charge renormalization in the standard model Paresh Malde, Robin G. Stuart (Michigan U.). May 1998. 29 pp. UM-TH-97-17 e-Print: hep-ph/9805364

[700] Hadronic contributions to the muon lifetime

Timo van Ritbergen, Robin G. Stuart (Michigan U.). Feb 1998. 10 pp. Published in Phys.Lett. B437 (1998) 201-208 UM-TH-98-03 e-Print: hep-ph/9802341

[701] O (N(f) alpha**2) radiative corrections in low-energy electroweak processes Robin G. Stuart (Michigan U.). Aug 1997. 4 pp. Published in In *Jerusalem 1997, High energy physics* 653-656 Talk given at Conference: C97-08-19, p.653-656 Proceedings e-Print: hep-ph/9712308

[702] Gauge invariance and the unstable particle Robin G. Stuart (Michigan U.). Jun 1997. 8 pp. Published in AIP Conf.Proc. 400 (1997) 199 Presented at Conference: C96-10-30, Presented at Conference: C96-11-01 Proceedings e-Print: hep-ph/9706550

[703] Reduction of one loop tensor form-factors to scalar integrals: A General scheme Ganesh Devaraj, Robin G. Stuart (Michigan U.). Apr 1997. 37 pp. Published in Nucl.Phys. B519 (1998) 483-513 UM-TH-97-07 e-Print: hep-ph/9704308

[704] Gauge invariance in boson production Robin G. Stuart (Michigan U.). Dec 1996. 8 pp. Published in In *Tegernsee 1996, The Higgs puzzle* 47-54 Talk given at Conference: C96-12-08.3, p.47-54 Proceedings e-Print: hep-ph/9706431

[705] $\mathcal{O}(\mathcal{N}(\{\})\alpha^{\in})$ corrections in low-energy electroweak processes R. Akhoury, Paresh Malde, Robin G. Stuart (Michigan U.). Oct 1996. 10 pp. UM-TH-96-16 e-Print: hep-ph/9707520

[706] $\mathcal{O}(\mathcal{N}(\{\})\alpha^{\in})$ corrections to muon decay Robin G. Stuart (Michigan U.). Aug 1996. 8 pp. Published in Acta Phys.Polon. B28 (1997) 599-605 Talk given at Conference: C96-08-01 Proceedings e-Print: hep-ph/9706422

[707] Gauge invariance in the process e+ e- —¿ anti-electron-neutrino e- W+ —¿ anti-electron-neutrino e- u anti-d Robin G. Stuart (Michigan U.). Mar 1996. 10 pp. Published in Eur.Phys.J. C4 (1998) 259-263 UM-TH-96-05 e-Print: hep-ph/9603351

[708] Model independent representation of electroweak data Robin G. Stuart (Michigan U.). Feb 1996. 13 pp. Published in Phys.Rev. D56 (1997) 1515-1521 UM-TH-96-02

[709] Unstable particles Robin G. Stuart (Michigan U. and Mexico U.). Apr 1995. 15 pp. UM-TH-95-13, C92-02-05.1 Conference: C92-02-05.1 (Ringberg Electroweak 1995:0235-246), p.0235-246 e-Print: hep-ph/9504308

[710] Eliminating the hadronic uncertainty Robin G. Stuart (Michigan U. and Mexico U.). Mar 1995. 8 pp. Published in Phys.Rev. D52 (1995) 1655-1658 UM-TH-95-05 e-Print: hep-ph/9503279

[711] Production cross-sections for unstable particles Robin G. Stuart (Michigan U. and Mexico U.). Mar 1995. 10 pp. Published in Nucl.Phys. B498 (1997) 28-38 UM-TH-95-06 e-Print: hep-ph/9504215

[712] Algebraic reduction of Feynman diagrams to scalar integrals: A Mathematica implementation of LERG-I Robin G. Stuart (Mexico U.). Jul 1994. 16 pp. Published in Comput.Phys.Commun. 85 (1995) 267-277 UM-TH-94-22 e-Print: hep-ph/9409273

[713] The Structure of the Z0 resonance and the physical properties of the Z0 boson Robin G. Stuart (Mexico U.). Sep 1, 1992. 13 pp. Published in Phys.Rev.Lett. 70 (1993) 3193-3196 PRINT-92-0347 (MEXICO)

[714] ZOPOLE: A Program to calculate the electroweak and QCD radiative corrections to e+ e- —¿ f anti-f near the Z0 resonance Bernd A. Kniehl (DESY), Robin G. Stuart (CERN). Mar 1992. 75 pp. Published in Comput.Phys.Commun. 72 (1992) 175-220 CERN-TH-6439-92

[715] The Charge radius and anapole moment of a free fermion A. Gongora, Robin G. Stuart (CERN). Dec 1991. 14 pp. Published in Z.Phys. C55 (1992) 101-106 CERN-TH-6348-91

[716] General renormalization of the gauge invariant perturbation expansion near the Z0 resonance Robin G. Stuart (CERN). May 1991. 6 pp. Published in Phys.Lett. B272 (1991) 353-358 CERN-TH-6134-91

[717] Gauge invariance, analyticity and physical observables at the Z0 resonance Robin G. Stuart (CINVESTAV, IPN). Feb 1991. 7 pp. Published in Phys.Lett. B262 (1991) 113-119 CINVESTAV-FIS-1-91

[718] Electroweak radiative corrections to b quark production Bryan W. Lynn, Robin G. Stuart (CERN). Jun 1990. 7 pp. Published in Phys.Lett. B252 (1990) 676-682 CERN-TH-5786-90

[719] Higher Order Dominance In The Standard Model Wei-Shu Hou (PSI, Villigen), Robin G. Stuart (CERN). Feb 1990. 7 pp. Published in Phys.Lett. B242 (1990) 467-473 CERN-TH-5650/90, PSI-PR-90-06

[720] Algebraic Reduction of One Loop Feynman Diagrams to Scalar Integrals. 2. Robin G. Stuart (CINVESTAV, IPN), A. Gongora (Mexico U.). Apr 1989. 15 pp. Published in Comput.Phys.Commun. 56 (1990) 337-350 CINVESTAV/FIS-05/89

[721] Hadronic And Photonic Corrections To A(lr) Bernd A. Kniehl, Johann H. Kuhn, R.G. Stuart (Munich, Max Planck Inst.). 1989. Published in IN *ALEXANDER, G. (ED.) ET AL.: POLARIZATION AT LEP, VOL. 1* 158-196

[722] (Hollik 55.) W.J. Marciano, Phys. Rev. D 20, 274 (1979)

[723] (Hollik 117.) Electroweak radiative corrections to b —¿ s gamma Andrzej Czarnecki, William J. Marciano (Brookhaven). Apr 1998. 8 pp. Published in Phys.Rev.Lett. 81 (1998) 277-280 BNL-HET-98-11 e-Print: hep-ph/9804252

[724] (Hollik 125.) Electroweak Fermion loop contributions to the muon anomalous magnetic moment Andrzej Czarnecki, Bernd Krause (Karlsruhe U., TTP), William J. Marciano (Brookhaven). Jun 1995. 10 pp. Published in Phys.Rev. D52

(1995) R2619-R2623 TTP-95-19 e-Print: hep-ph/9506256

[725] (Hollik 125.) Electroweak corrections to the muon anomalous magnetic moment Andrzej Czarnecki, Bernd Krause (Karlsruhe U., TTP), William J. Marciano (Brookhaven). Dec 1995. 7 pp. Published in Phys.Rev.Lett. 76 (1996) 3267-3270 TTP-95-34, TTP95-34 e-Print: hep-ph/9512369 bosonic 2-loop calculated

[726] W.J. Marciano, A.I. Sanda, Gauge Theory Predictions for the Electron - Nucleus Parity Violating Neutral Current Interaction, Phys.Lett. 77B (1978) 383-388, COO-2232B-153, Dominant 1-loop Beyond the SM and SM only: sub-dominant 1-loop SM calculations are missing; (C2).

[727] W.J. Marciano, A.I. Sanda, Parity violations in atoms induced by radiative corrections, Phys.Rev. D17 (1978) 3055, Dominant 1-loop Beyond the SM and SM only: sub-dominant 1-loop SM calculations are missing; (C2).

[728] William J. Marciano, $sin^2(\theta_W)$ and radiative corrections, Conf.Proc. C860716 (1986) 999, BNL-38767

[729] W.J. Marciano, Dimensional Regularization and Mass Singularities, Phys.Rev. D12 (1975) 3861, E-11-1-2232B-80,

[730] W.J. Marciano, W.J. Marciano, G.C. Marques, N. Papanicolaou, On Infrared Problems in Muon Decay, Nucl.Phys. B96 (1975) 237-254, Print-74-1600 (ROCKEFELLER)

[731] W.J. Marciano, Dimensional Regularization and Finite Calculations in Gauge Theories, Nucl.Phys. B84 (1975) 132-140, Print-74-1327 (NEW YORK),

[732] David Albert, William J. Marciano, Daniel Wyler, Zohreh Parsa, Decays of Intermediate Vector Bosons, Radiative Corrections and QCD Jets, Nucl.Phys. B166 (1980) 460-492, COO-2232B-190,

[733] William J. Marciano, Zohreh Parsa, Predicted Properties of the $W^\pm$ and Z^0, Published in eConf C8206282 (1982) 155-158, BNL-32012, CONF-8206120-8, Proceedings of Conference: C82-06-28.2 (Snowmass Summer Study 1982:0155)

[734] Electroweak radiative corrections to polarized Moller scattering asymmetries Andrzej Czarnecki (Karlsruhe U., TTP), William J. Marciano (Brookhaven and Washington U., Seattle). Jul 1995. 13 pp. Published in Phys.Rev. D53 (1996) 1066-1072 TTP-95-14, TTP95-14 e-Print: hep-ph/9507420

[735] Radiative corrections to neutral current processes William J. Marciano (Brookhaven). Jul 1993. 31 pp. Published in Adv.Ser.Direct.High Energy Phys. 14 (1995) 170-200 BNL-49238

[736] Quantitative tests of the standard model of electroweak interactions William J. Marciano (Brookhaven). Apr 29, 1991. 45 pp. Published in Ann.Rev.Nucl.Part.Sci. 41 (1991) 469-509 BNL-45999

[737] Atomic parity violation as a probe of new physics William J. Marciano (Brookhaven), Jonathan L. Rosner (Chicago U., EFI and Chicago U.). Aug 1990. 13 pp. Published in Phys.Rev.Lett. 65 (1990) 2963-2966, Erratum: Phys.Rev.Lett. 68 (1992) 898 BNL-44997, EFI-90-55

[738] Radiative Corrections and Semileptonic BB Decays David Atwood, William J. Marciano (Brookhaven). Dec 1989. 16 pp. Published in Phys.Rev. D41 (1990) 1736 BNL-43638

[739] Heavy Top Quark Mass Predictions W.J. Marciano (Brookhaven). 1989. 4 pp. Published in Phys.Rev.Lett. 62 (1989) 2793-2796

[740] (Hollik 24.) D.C. Kennedy, B.W. Lynn, Electroweak Radiative Corrections with an Effective Lagrangian: Four Fermion Processes, Nucl.Phys. B322 (1989) 1, SLAC-PUB-4039 July 1987, SLAC-PUB-4039-REV January 1988,

[741] B.W.Lynn, High Precision Tests of Electroweak Theories on the Resonance, in Polarization at LEP, Ed. G.Alexander et. al., Vol 1, pg. 13, Yellow Book Report, CERN 88-06, September 1988;

[742] "Radiative Corrections In $SU(2)_L \times U(1)$, Proceedings, Workshop, Trieste, Italy, June 6-8, 1983, B.W. Lynn (ed.), J.F. Wheater (ed.). 1984, Published in Singapore, Singapore World Scientific (1984) 335p.

[743] B.W. Lynn, SLAC Pub. 3358, June 1984 first proposed that LEP1/SLC placed 1-loop non-decoupling constraints on SUSY, e.g. SUGRA-inspired masses of global SUSY gauginos and Higgsinos;

[744] M.E.Peskin and B.W.Lynn, UC Santa Barbara seminar August 1984, (unpublished) first showed the extraordinary sensitivity, on the Z-pole, of $e^+e^- \to \mu^+\mu^-, e^+e^- \to f\bar{f}$ and the electron polarization asymmetry $A_{LR}(e^+e^- \to hadrons)$:

[745] An exhaustive 1988 account of the effects of heavy BSM oblique-loop physics on A_{LR} is in B.W.Lynn, High Precision Tests of Electroweak Theories on the Z0 Resonance, in Polarization at LEP, Ed. G.Alexander et. al., Vol 1, pg. 13, Yellow Book Report, CERN 88-06, September 1988; D.C.Kennedy, SLAC-PUB-4726 (1988)

[746] Tests of Electroweak Theories: Polarized Processes and Other Phenomena, Proceedings of the Conference at Trieste, Italy, June 10-12, 1985, B.W. Lynn and C. Verzegnassi (Eds.), Singapore, World Scientific (1986) 461 (C3).

[747] B.W. Lynn, "$\mathcal{O}(\alpha_{QED}G_\mu)$ Corrections to the Parity Violating Electron Quark Potential In the Weinberg-salam Theory. Parity Violations In One Electron Atoms", ICTP preprint, Trieste 1982, Conference: C82-06-28.1 (1982) 965; complete SM 1-loop (C2).

[748] B.W. Lynn, D.C. Kennedy and C. Verzegnassi, $\mathcal{O}(\alpha^2_{QED})$ $W^\pm$ mass shift from a very heavy top quark, SLAC-PUB-4127 October 1986, Contributed to Conference: C86-09-29

[749] D.C. Kennedy, B.W. Lynn The Renormalization Of Electroweak Interactions And The Bremmus Monte Carlo Simulator SLAC preprint 1986. Pub-

lished in *TAHOE CITY 1986, PROCEEDINGS, SLC PHYSICS*, 40-44

[750] B.W. Lynn, Radiative corrections to the muon lifetime, $W^{\pm}$ mass, and longitudinal polarization asymmetry in $e^+e^- \rightarrow \mu^+\mu^-$ IN N=1 SUSY $SU(3) \times SU(2) \times U(1)$ AND N=1 SUGRA: sliding singlet models, SLAC and Oxford U. preprint Jun 1984, SLAC-PUB-3358.

[751] B.W. Lynn, Radiative corrections to the Z^0 Mass in $SU(2)_L \times SU(2)_R \times U(1)$: Higgs' C (2,1,1), B (1,2,1) and Phi (2,2,1); Oxford U. . preprint Jan 1984 OXFORD-TP 78/83.

[752] B.W. Lynn, $\mathcal{O}(\alpha G_\mu)$ Corrections to the Parity Violating Electron - Quark Potential in the Weinberg-Salam Theory: Parity Violations In Atoms, Oxford U. preprint Dec 1983, PRINT-83-1066 (OXFORD), OXFORD-TP-89-83; Conference: C83-06-06.1 (Trieste Topical Conf.1983:289)

[753] B.W. Lynn, Magnetic Moment of Massive Neutrinos and the Cosmic Helium Abundances, Phys.Rev. D23 (1981) 2151, CU-TP-191,

[754] B.W. Lynn and G. Feinberg, Magnetic Moment of Massive Neutrinos, Columbia U. preprint, June 1980, CU-TP-181

[755] Strong Interaction Contributions To One Loop Leptonic Process B.W. Lynn (SLAC), G. Penso (Rome U. and INFN, Rome), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Jul 1985. 29 pp. Published in Phys.Rev. D35 (1987) 42 SLAC-PUB-3742

[756] Precision Measurements of Final State Weak Coupling From Polarized Electron - Positron Annihilation A. Blondel (CERN), B.W. Lynn (Stanford U., Phys. Dept.), F.M. Renard, C. Verzegnassi (Montpellier U.). Mar 1987. 13 pp. Published in Nucl.Phys. B304 (1988) 438-450 PM-87/14

[757] O (alpha**2) W MASS SHIFT FROM A VERY HEAVY TOP QUARK B.W. Lynn, D.C. Kennedy (Stanford U., ITP and SLAC), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Oct 1986. 7 pp. SLAC-PUB-4127 Contributed to Conference: C86-09-29

[758] Longitudinal ee Beam Polarization Asymmetry in e+eee Hadrons B.W. Lynn (Stanford U., ITP), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Oct 1986. 54 pp. Published in Phys.Rev. D35 (1987) 3326 SLAC-PUB-3967

[759] Washing Out Final State Strong Interactions in the Longitudinal Polarization Asymmetry for e+eee Hadrons Near the Z0Z0 Peak to Lowest Em Order B.W. Lynn (SLAC), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Jul 1986. 18 pp. Published in Nuovo Cim. A94 (1986) 15 SISSA-13-86-EP

[760] Tests Of Electroweak Theories: Polarized Processes And Other Phenomena. Proceedings, Conference, Trieste, Italy, June 10-12, 1985 B.W. Lynn (ed.), C. Verzegnassi (ed.). 1986. Published in Singapore, Singapore: World Scientific (1986) 461 p

[761] Delayed Unitarity Cancellation and Heavy Particle Effects in e+eW+WeeWW Chang-rim Ahn, Michael E. Peskin (SLAC), B.W. Lynn, Stephen B. Selipsky (Stanford U., Phys. Dept.). Apr 1988. 38 pp. Published in Nucl.Phys. B309 (1988) 221-258 SLAC-PUB-4600

[762] Electroweak Radiative Corrections with an Effective Lagrangian: Four Fermion Processes D.C. Kennedy, B.W. Lynn (Stanford U., ITP and SLAC). Jan 1988. 54 pp. Published in Nucl.Phys. B322 (1989) 1-54 SLAC-PUB-4039, SLAC-PUB-4039-REV

[763] The Renormalization Of Electroweak Interactions And The Bremmus Monte Carlo Simulator D.C. Kennedy, B.W. Lynn (SLAC). 1986. Published in IN *TAHOE CITY 1986, PROCEEDINGS, SLC PHYSICS*, 40-44

[764] Radiative Corrections In Su(2)-l X U(1). Proceedings, Workshop, Trieste, Italy, June 6-8, 1983 B.W. Lynn (ed.), J.F. Wheater (ed.). 1984. Published in Singapore, Singapore: World Scientific (1984) 335p

[765] B.W. Lynn and P.H. Sandars, "Electroweak radiative corrections to atomic parity nonconservation", Published in J.Phys.B (1993), SSCL-PREPRINT-183 (June 1993) (C2).

[766] Low-Energy Gauge Coupling in Grand Unified Theories and High Precision Physics Bryan W. Lynn (Stanford U., Phys. Dept. and SSCL). Sep 1993. 24 pp. Published in Submitted to: Phys.Lett.B SU-ITP-93-22, SSCL-PREPRINT-506-93

[767] Radiative corrections in unconstrained SU(2) x U(1) and the top mass problem Bryan W. Lynn (CERN and Stanford U., Phys. Dept.), E. Nardi (CERN and SISSA, Trieste and INFN, Trieste). Sep 1990. 34 pp. Published in Nucl.Phys. B381 (1992) 467-500 CERN-TH-5876-90, SISSA-121-90-EP

[768] GAUGE INVARIANCE OF RUNNING COUPLINGS IN SU(2)-L x U(1) Bryan W. Lynn (Stanford U., Phys. Dept. and SLAC). Aug 1989. 8 pp. Published in Submitted to: Nucl.Phys.B, Submitted to: Phys.Lett.B SLAC-PUB-5077, SU-ITP-867

[769] B.W. Lynn, G.D. Starkman and R. Stora, "Hidden $U(1) - Y$ Ward-Takahashi identities for off-shell Green's functions and on-shell T-Matrix elements in the scalar-sector of the extended Abelian Higgs model", arXiv:1509.06198 [hep-ph]; Shows a new anomaly-free global symmetry of the spontaneously broken AHM gauge theory; submitted to Phys. Rev. D;

[770] B.W. Lynn, "Spontaneously broken Standard Model symmetries and the Goldstone theorem protect the Higgs mass and ensure that it has no Higgs Fine Tuning Problem", arXiv [hep-ph] 1106.6354; submitted July 2011 to Phys. Rev. D;

[771] B.W. Lynn, arXiv [hep] 1005.2124 "Liquid phases in $SU(3)$ Chiral Perturbation Theory $SU - 3\chi PT$: Drops of Strange Chiral Nucleon Liquids

($S\chi NL$) and Ordinary Chiral Heavy Nuclear Liquids (χNL)”; submitted 27 May 2010 to Phys. Rev. C, Id=DS10840; accepted for publication ∼August 2010 in Phys. Rev. C;

[772] B.W. Lynn, “Chiral $SU(2)_L \times SU(2)_R$ liquids: a theory of heavy nuclei and neutron stars”, Nucl. Phys. B402 (1993) 281; First suggested that $SU_2\chi PT$ “... will produce drops of chiral liquid which reproduce the details ... of bulk nuclear structure.” The mean field ubiquitous to chiral liquids might possibly solve one of J.M. Blatt and V.F. Weisskopf’s [773] unsolved “... fundamental problems of nuclear structure ... the unexpected indications of a shell structure in the nucleus ...”; Since vindicated (with zero pion condensate) by chiral-liquid-only operators in RMF-PC-HF nuclear Skyrme models [774, 775].

[773] J.M. Blatt and V.F. Weisskopf, “Theoretical Nuclear Physics”, Wiley, NY 1960.

[774] J. Friar, D.Madland and B.W. Lynn, “QCD Scales in Finite Nuclei”, arXiv:nucl-th/951206v1, Phys.Rev. C53 (1996) 3085;

[775] J.Friar, “Nuclear Scales”, arXiv:nucl-th/980410v1;

[776] David M. Jacobs, Glenn D. Starkman and Bryan W. Lynn, “Macro Dark Matter”, arXiv [astro-phys]1410.2236, MNRAS, 450, 3418 (2015);

[777] Electroweak theory without Higgs bosons Angus F. Nicholson (Australian Natl. U., Canberra), D.C. Kennedy (Florida U.). Jun 1997. 23 29 pp. Published in Int.J.Mod.Phys. A15 (1998) 1497-1519 e-Print: hep-ph/9706471

[778] Gauge boson mass without a Higgs field: A Simple model Angus F. Nicholson (Australian Natl. U., Canberra), Dallas C. Kennedy (Florida U.). Feb 1997. 29 pp. Published in Submitted to: Nucl.Phys.B UF-IFT-HEP-96-29 e-Print: hep-th/9702113

[779] D.C.Kennedy, SLAC-PUB-4726 (1988) unpublished; TITLE?

[780] D.C. Kennedy, The Brem5 Electroweak Monte Carlo, Dec 1987 Conference: C87-02-25, p.110-115

[781] Grand Unification At Slc / Lep D.C. Kennedy, B.W. Lynn (SLAC and Stanford U., Phys. Dept.). May 1988. 21 pp. Published in Submitted to: Nucl.Phys.B SLAC-PUB-4608

[782] The Electroweak Polarization Asymmetry: A Guided Tour D.C. Kennedy (SLAC and Stanford U., Phys. Dept.). Oct 1988. 38 pp. SLAC-PUB-4726 Extended version of an invited talk given at Conference: C88-09-12

[783] Theory of the Z polarization asymmetry D.C. Kennedy (SLAC and Stanford U.). 1988. 19 pp. Published in AIP Conf.Proc. 187 (2008) 244-262

[784] Precision electroweak experiments and heavy physics: A Global analysis D.C. Kennedy, Paul Langacker (Pennsylvania U.). Sep 1990. 13 pp. Published in Phys.Rev.Lett. 65 (1990) 2967-2970, Erratum: Phys.Rev.Lett. 66 (1991) 395 UPR-0436T

[785] D.C. Kennedy and P. Langacker, Phys.Rev.Lett. 65 (1990) 2967;

[786] Electroweak flavor conserving gauge processes: Virtual effects Dallas C. Kennedy (Florida U.). Nov 1994. 14 pp. UFIFT-HEP-94-16 e-Print: hep-ph/9411401

[787] Bremsstrahlung for p anti-p production of charmonium D.C. Kennedy (Fermilab). Feb 1992. 5 pp. Published in Phys.Rev. D46 (1992) 461-462 FERMILAB-PUB-92-053-T

[788] Global symmetry properties of electroweak heavy physics parameters D.C. Kennedy (Pennsylvania U.). Jul 1991. 3 pp. Published in Phys.Lett. B268 (1991) 86-88 UPR-0478T

[789] Precision electroweak experiments and heavy physics: An Update D.C. Kennedy, Paul Langacker (Pennsylvania U.). Mar 1991. 4 pp. Published in Phys.Rev. D44 (1991) 1591-1592 UPR-0467T

[790] Electroweak effective Lagrangian and running couplings revisited D.C. Kennedy (Pennsylvania U.). Aug 1990. 9 pp. Published in Nucl.Phys. B351 (1991) 81-89 UPR-0422T-REV, UPR-0422T

[791] Nonperturbative restoration of decoupling D.C. Kennedy (Pennsylvania U.). Jun 1990. 7 pp. Published in Mod.Phys.Lett. A6 (1991) 1459-1464 UPR-0425T

[792] (Hollik 10.) D.Yu. Bardin, P.Ch. Khristova, O.M. Fedorenko, Nucl. Phys. B 197, 1 (1982);

[793] (Hollik 10.) D.Yu. Bardin, M.S. Bilenky, G.V. Mitselmakher, T. Riemann, M. Sachwitz, Z. Phys. C 44, 493 (1989)

[794] (Hollik 57.) D. Yu. Bardin, A.V. Chizhov, Dubna preprint E2- 89-525 (1989);

[795] (Hollik 67.) A.A. Akhundov, D.Yu. Bardin, T. Riemann, Nucl. Phys. B 276, 1 (1986);

[796] (Hollik 80.) S. Jadach et al., in Reports of the Working Group on Precision Calculations for the Z Resonance, CERN 95-03 (1995), p. 341, eds. D. Bardin, W. Hollik, G. Passarino;

[797] (Hollik 87.) D. Bardin et al., hep-ph/9412201

[798] (Hollik 89.) D. Bardin, G. Passarino, hep-ph/9803425

[799] D.Yu. Bardin, V.A. Dokuchaeva Exact Calculations of the One Loop Electroweak Corrections to Neutrino - Electron Elastic Scattering at Low-energies (In Russian), Sov.J.Nucl.Phys. 43 (1986) 975, Yad.Fiz. 43 (1986) 1513-1524, JINR-P2-85-387

[800] D.Yu. Bardin, V.A. Dokuchaeva On One Loop Electroweak Corrections To Electron - Neutrino Elastic Scattering (In Russian) Nucl.Phys. B246 (1984) 221-230, JINR-P2-83-818,

[801] D.Yu. Bardin, V.A. Dokuchaeva About One Loop Electroweak Corrections to the Cross-section of $\nu_\mu e$, $\bar{\nu}_\mu e$ Scattering Processes (In Russian), Sov.J.Nucl.Phys. 39 (1984) 563, Yad.Fiz. 39 (1984) 888-894, JINR-P2-83-438

[802] D.Yu. Bardin, O.M. Fedorenko, P.Kh. Khristova, On The Lowest Order Electroweak Corrections To Fermion - Boson Scattering: Selfenergy And Ver-

tex Diagrams (In Russian), (Dubna, JINR). Dec 1982, Submitted to: Nucl.Phys.B, JINR-P2-82-840

[803] D.Yu. Bardin, O.M. Fedorenko, P.Kh. Khristova, On the Lowest Order Electroweak Corrections to Spin 1/2 Fermion Scattering. 2. The One Loop Amplitudes, Nucl.Phys. B197 (1982) 1-44, JINR-E2-81-486,

[804] D.Yu. Bardin, P.Kh. Khristova, O.M. Fedorenko, On the Lowest Order Electroweak Corrections to Spin 1/2 Fermion Scattering. 1. The One Loop Diagrammar, Nucl.Phys. B175 (1980) 435-461, JINR-E2-80-64,

[805] A.A. Akhundov, D.Yu. Bardin, N.M. Shumeiko, Electromagnetic Corrections to Elastic Radiative Tail in Deep Inelastic Lepton - Nucleon Scattering (In Russian), Sov.J.Nucl.Phys. 44 (1986) 988, Yad.Fiz. 44 (1986) 1517-1526, JINR-P2-85-831

[806] D.Yu. Bardin, O.M. Fedorenko, N.M. Shumeiko, Radiative Corrections to PP Odd Asymmetries in Deep Inelastic Scattering of Polarized Muons on Nucleons at TeV Energies, J.Phys. G7 (1981) 1331, JINR-E2-80-503,

[807] D.Yu. Bardin, O.M. Fedorenko, N.M. Shumeiko, Radiative Corrections To P Odd Asymmetries In Deep Inelastic Scattering Of Polarized Leptons And Anti-leptons On Nucleons, Aug 1979, Submitted to: Yadernaya Fiz, JINR-E2-12761

[808] D.Yu. Bardin, Igor A. Savin, N.M. Shumeiko, Radiative corrections to the deep inelastic mu N scattering in the TeV region, eConf C791004 (1979) 312, Proceedings of Conference: C79-10-04

[809] D.Yu. Bardin, N.M. Shumeiko, On the Weak Neutral Current and Electromagnetic Correction Effects on the Quantities Measured in Deep Inelastic Lepton-N Scattering (In Russian), Sov.J.Nucl.Phys. 29 (1979) 499, Yad.Fiz. 29 (1979) 969-981, JINR-P2-10873

[810] A.A. Akhundov, D.Yu. Bardin, N.M. Shumeiko Electromagnetic Corrections to the Deep Inelastic mu p Scattering at High-Energies, Sov.J.Nucl.Phys. 26 (1977) 660, Yad.Fiz. 26 (1977) 1251-1257, JINR-E2-10471

[811] D.Yu. Bardin, N.M. Shumeiko An Exact Calculation of the Lowest Order Electromagnetic Correction to the Elastic Scattering (In Russian), Nucl.Phys. B127 (1977) 242-258, JINR-P2-10113,

[812] D.Yu. Bardin, N.M. Shumeiko, Radiation Corrections to the Process of Deep Inelastic Lepton-N Scattering (In Russian), (Belarus State U.) Jul 1976, Submitted to: Phys.Lett., JINR-P2-9940

[813] D.Yu. Bardin, V.B. Semikoz, N.M. Shumeiko, Radiation corrections to pi-e scattering (In Russian), Yad.Fiz. 10 (1969) 1020-1033

[814] D.Yu. Bardin, Mikhail S. Bilenky, O.M. Fedorenko, T. Riemann, The Electromagnetic α^3 Contributions To E+ E- Annihilation Into Fermions In The Electroweak Theory. Total Cross-section Sigma-t And Integrated Symmetry A(fb). (Dubna, JINR). May 1988, Submitted to: Nucl.Phys., JINR-E2-88-324

[815] D.Yu. Bardin, A. Leike, T. Riemann, M. Sachwitz, Energy Dependent Width Effects in e+ e- Annihilation Near the Z Boson Pole, Phys.Lett. B206 (1988) 539-542, PHE-88-03,

[816] Electroweak Radiative Corrections At Hera Energies D.Yu. Bardin, C. Burdik (Dubna, JINR), P.Kh. Khristova (Preslavski U.), T. Riemann (DESY, Zeuthen). 1987. Published in IN *SELLIN 1987, PROCEEDINGS, THEORY OF ELEMENTARY PARTICLES* 324-330.

[817] ZFITTER, A. Akhundov, A. Arbuzov, D. Bardin, P. Khristova, L. Kalinovskaya, A. Olshevsky, S. Riemann, T. Riemann, websites zfitter.com, sanc.jinr.ru/users/zfitter and zfitter.education.

[818] ZFITTER support, D. Bardin et. al., Comput. Phys. Commun. 174(2006)728, hep-ph/0507146, websites sanc.jinr.ru/users/zfitter and zfitter.education (C7)

[819] D. Bardin, M. Bilenky, P. Khristova, M. Jack, L. Kalinovskaya, A. Olshevsky, S. Riemann and T. Riemann, honored as First Scientific Award of JINR, Dubna, 19 January 2001, referee Lew B. Okun.

[820] (Hollik 78.) F.A. Berends et al., in: Z Physics at LEP 1, CERN 89-08 (1989), eds. G. Altarelli, R. Kleiss, C. Verzegnassi, Vol. I, p. 89;

[821] (Hollik 78.) W. Beenakker, F.A. Berends, S.C. van der Marck, Z. Phys. C 46, 687 (1990);

[822] (Hollik 78.) G. Burgers, F.A. Berends, W.L. van Neerven, Nucl. Phys. B 297, 429 (1988); E: 304, 921 (1988);

[823] (Hollik 78.) G. Burgers, F.A. Berends, W.L. van Neerven, Nucl. Phys. B 304, 921 (1988);

[824] (Hollik 78.) W. Beenakker, F.A. Berends, S.C. van der Marck, Z. Phys. C 46, 687 (1990)

[825] (Hollik 100.) W. Beenakker, A.P. Chapovsky, F.A. Berends, Nucl. Phys. B 508, 17 (1997);

[826] (Hollik 100.) W. Beenakker, A.P. Chapovsky, F.A. Berends, Phys. Lett. B18, 411, 203 (1997)

[827] (Hollik 100.) W. Beenakker, A.P. Chapovsky, F.A. Berends, Phys. Lett. B18, 203 (1997)

[828] Frits A. Berends, G.J.H. Burgers, W.L. van Neerven, QED Radiative Corrections to the Reaction $e^+e^- \to Z\gamma$ Phys.Lett. B177 (1986) 191-194

[829] Frits A. Berends, P.H. Daverveldt, R. Kleiss, Monte Carlo Simulation of Two Photon Processes. 1.: Radiative Corrections to Multiperipheral $e^+e^- \to \mu^+\mu^-$ Production, Comput.Phys.Commun. 40 (1986) 271-284

[830] Frits A. Berends, P.H. Daverveldt, R. Kleiss, Radiative Corrections to the Process $e^+e^- \to e^+e^-\mu^+\mu^-$, Nucl.Phys. B253 (1985) 421

[831] CALKUL Collaboration (Frits A. Berends et al.), Multiple Bremsstrahlung in Gauge Theories at High-energies. 6. The Process $e^+e^- \to e^+e^-\gamma\gamma$, Nucl.Phys. B264 (1986) 265-276

[832] Frits A. Berends, R. Kleiss, J.P. Revol, J.P. Vialle, QED Radiative Corrections and Radiative Decays of the Intermediate Weak Bosons Produced in Proton - Anti-proton Collisions, Z.Phys. C27

(1985) 155, CERN-EP/84-117,

[833] Frits A. Berends, R. Kleiss, Initial State Radiation at LEP Energies and the Corrections to Higgs Boson Production, Nucl.Phys. B260 (1985) 32-60

[834] Frits A. Berends, R. Kleiss, Hard Photon Effects in $W^{\pm}$ and Z^0 Decay, Z.Phys. C27 (1985) 365, Print-84-0394 (LEIDEN),

[835] CALKUL Collaboration (Frits A. Berends et al.), Multiple Bremsstrahlung in Gauge Theories at High-energies. 5.: The Process $e^+e^- \to \mu^+\mu^-\gamma\gamma$, Nucl.Phys. B264 (1986) 243

[836] CALKUL Collaboration (Frits A. Berends et al.), Multiple Bremsstrahlung in Gauge Theories at High-energies. 3. Finite Mass Effects in Collinear Photon Bremsstrahlung, Nucl.Phys. B239 (1984) 382-394

[837] CALKUL Collaboration (Frits A. Berends et al.), Multiple Bremsstrahlung in Gauge Theories at High-Energies. 4.: The Process $e^+e^- \to \gamma\gamma\gamma\gamma$, Nucl.Phys. B239 (1984) 395-409

[838] Frits A. Berends, Radiative Corrections In Electron - Positron Collisions At Present And Future Energies, Proc. of Europhysics Study Conf. on Electroweak Conference: C83-02-01 (Erice EPS:Electroweak 1983:477)

[839] Frits A. Berends, R. Kleiss, S. Jadach, Monte Carlo Simulation of Radiative Corrections to the Processes $e^+e^- \to \mu^+\mu^-$ and $e^+e^- \to q\bar{q}$ in the Z0 Region, Comput.Phys.Commun. 29 (1983) 185-200

[840] Frits A. Berends, R. Kleiss, S. Jadach, Z. Was, QED Radiative Corrections To Electron - Positron Annihilation Into Heavy Fermions, Acta Phys.Polon. B14 (1983) 413

[841] Frits A. Berends, R. Kleiss, S. Jadach, Radiative Corrections to Muon Pair and Quark Pair Production in Electron-Positron Collisions in the Z(0) Region, Nucl.Phys. B202 (1982) 63-88

[842] Frits A. Berends, R. Kleiss, Distributions for electron-Positron Annihilation Into Two and Three Photons, Nucl.Phys. B186 (1981) 22-34

[843] Frits A. Berends, R. Kleiss, Initial State Radiation for e^+e^- Annihilation Into Jets, Nucl.Phys. B178 (1981) 141-150

[844] Frits A. Berends, R. Kleiss, Distributions in the Process $e^+e^- \to \mu^+\mu^-\gamma$, Nucl.Phys. B177 (1981) 237-262

[845] Frits A. Berends, R. Gastmans, Radiative Corrections in e^+e^- Collisions, Published in *Donnachie A, Shaw G: Electromagnetic Interactions Of Hadrons, Vol.Ii*, New York 1978, 471-522

[846] Frits A. Berends, G.J. Komen, Soft and Hard Photon Corrections for mu Pair Production and Bhabha Scattering in Presence of a Resonance, Nucl.Phys. B115 (1976) 114-140

[847] Frits A. Berends, G.J. Komen, Radiative Corrections to Bhabha Scattering and mu Pair Production from the Hadronic Vacuum Polarization, Phys.Lett. 63B (1976) 432-434

[848] Frits A. Berends, K.J.F. Gaemers, G.J. Komen, Resonances and Interference Effects in Bhabha Scattering and mu Pair Production, Leiden U. preprint Jan 1975, Print-75-0131 (LEIDEN)

[849] Frits A. Berends, K.J.F. Gaemers, R. Gastmans, Hard photon corrections for Bhabha scattering, Nucl.Phys. B68 (1974) 541-550

[850] Frits A. Berends, K.J.F. Gaemers, R. Gastmans, $\mathcal{O}(\alpha^3)$ Contribution to the angular asymmetry in $e^+e^- \to \mu^+\mu^-$, Nucl.Phys. B63 (1973) 381-397,

[851] Frits A. Berends, R. Gastmans, Hard photon corrections for $e^+e^- \to \gamma\gamma$, Nucl.Phys. B61 (1973) 414-428,

[852] Frits A. Berends, K.J.F. Gaemer, R. Gastmans, Hard photon corrections for the process $e^+e^- \to \mu^+\mu^-$, Nucl.Phys. B57 (1973) 381-400, Erratum: Nucl.Phys. B75 (1974) 546-546,

[853] M. Bohm, Ansgar Denner, T. Sack, W. Beenakker, Frits A. Berends, H. Kuijf, Electroweak Radiative Corrections to $e^+e^- \to W^+W^-$, Nucl.Phys. B304 (1988) 463-499, Print-88-0073 (WURZBURG),

[854] (Hollik 47.) A. Djouadi, C. Verzegnassi, Phys. Lett. B 195, 265 (1987)

[855] F.M. Renard, C. Verzegnassi, Special Properties of e+eee Hadrons Asymmetries Including O () O (ss) Radiative Corrections on Top of Z^0 Resonance, Phys.Lett. B178 (1986) 289-295, SISSA-31/86/EP (ICTP and U. Trieste, Trieste),

[856] C. Verzegnassi, One Loop Hadronic Radiative Corrections to Leptonic Processes in the GSW Model, (SISSA, Trieste) June 1985, SISSA-85/85/EP; Conference: C85-06-10.1 (Trieste Electroweak 1985:0353)

[857] C. Verzegnassi, Radiative Corrections To The (W, Z) Mass Correlation From Nonperturbative QCD And Muon Anomaly, Phys.Lett. 147B (1984) 455-459,

[858] C. Verzegnassi, High Precision Tests Of The Standard $SU(3)_C \times SU(2)_L \times U(1)_Y$ Model To One Loop From Polarized $e^+e^- \to$ Hadrons On Z0 Resonance, (SISSA, Trieste) 1987, Published in Trieste Int. Sch. Advanc. Stud. - 87-033 E.P. (87,REC.JUN.)

[859] New Physics Sum Rules From Polarized Electron - Positron Asymmetries on ZZ Resonance F. Boudjema (Sussex U.), F.M. Renard (Montpellier U.), C. Verzegnassi (Sussex U.). 1987. 6 pp. Published in Phys.Lett. B202 (1988) 411-416 SISSA-110/87/EP, PM/87-54

[860] Strong Interactions Effects in e+eee Hadrons Asymmetries R. Kleiss (Leiden U.), F.M. Renard (Montpellier U.), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Oct 1986. 14 pp. Published in Nucl.Phys. B286 (1987) 669-682 PM-86-33

[861] Special Properties of e+eee Hadrons Asymmetries Including O () O (ss) Radiative Corrections on Top of Z0 Resonance F.M. Renard (Montpellier U.), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Jun 1986. 7 pp. Published in Phys.Lett. B178 (1986) 289-295 SISSA-31/86/EP

[862] Tests Of The Standard Model (and Beyond) From

Spin Physics C. Verzegnassi (CERN). Oct 1988. 10 pp. Published in AIP Conf.Proc. 187 (1988) 234-243 CERN-TH-5218-88

[863] Virtual Very Heavy Top Effects in LEP / SLC Precision Measurements A. Djouadi, C. Verzegnassi (Montpellier U.). Aug 11, 1987. 7 pp. Published in Phys.Lett. B195 (1987) 265-271 PM-87/13

[864] New Physics Sum Rules From Polarized Electron - Positron Asymmetries on ZZ Resonance F. Boudjema (Sussex U.), F.M. Renard (Montpellier U.), C. Verzegnassi (Sussex U.). 1987. 6 pp. Published in Phys.Lett. B202 (1988) 411-416 SISSA-110/87/EP, PM/87-54

[865] Top Quark Mass And Qcd Selfconsistency G.M. Pinna (Trieste U.), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Apr 1984. 5 pp. Published in Phys.Lett. 146B (1984) 78-82 SISSA-25/84/EP

[866] Radiative Corrections To The (w, Z) Mass Correlation From Nonperturbative Qcd And Muon Anomaly C. Verzegnassi (Trieste U. and SISSA, Trieste). 1984. 5 pp. Published in Phys.Lett. 147B (1984) 455-459 References — BibTeX — LaTeX(US) — LaTeX(EU) — Harvmac — EndNote ADS Abstract Service

[867] The Hadronic Muon Anomaly: An Unbiased Test Of Nonperturbative Qcd Expansions I. Caprini (Bucharest, IFIN-HH), J. Cole (Sussex U.), C. Verzegnassi (Trieste U. and SISSA, Trieste). 1984. 19 pp. Published in Nuovo Cim. A83 (1984) 121-139

[868] LIGHT QUARK MASSES FROM LOW-ENERGY e+ e- DATA: A NONCONVENTIONAL APPROACH G. Penso (Rome U. and INFN, Rome), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Aug 1983. 13 pp. SISSA-38/83/EP

[869] Remarks On Qcd Evaluations Of The Hadronic Part Of The Muon's (g - 2) Factor I. Caprini (Bucharest, IFIN-HH), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Aug 1983. 11 pp. Published in Nuovo Cim. A80 (1984) 187 SISSA-33/83/EP

[870] Heavy Quark Masses From Vacuum Polarization Moments Moving Maxima: A Realistic Selfconsistency Test Of Second Order Perturbative Qcd G. Penso (Rome U.), V. Roberto, C. Verzegnassi (Trieste U. and SISSA, Trieste). 1983. 16 pp. Published in Nuovo Cim. A75 (1983) 392-407

[871] Selfconsistency Correlations Between Qcd Parameters From E+ E- Annihilation C. Verzegnassi (Sussex U. and SISSA, Trieste). 1983. 6 pp. Published in Phys.Lett. 128B (1983) 101-106

[872] Qcd Order Parameter Correlation From E+ E- Data And Analyticity In A Constrained Functional Distance Minimization Approach I. Caprini, C. Verzegnassi (ICTP, Trieste and Trieste U. and SISSA, Trieste). 1983. 21 pp. Published in Nuovo Cim. A75 (1983) 275-295

[873] A Lower Bound for the Strange Quark Mass G. Penso (Rome U. and INFN, Rome), C. Verzegnassi (Trieste U. and INFN, Trieste and SISSA, Trieste). Jul 1982. 22 pp. Published in Nuovo Cim. A72 (1982) 113 SISSA-56/82/EP

[874] PERTURBATIVE VERSUS NONPERTURBATIVE QCD PARAMETERS FROM e+ e- ANNIHILATION Claudio Verzegnassi (Sussex U. and SISSA, Trieste). Apr 1982. 19 pp. SISSA-21/82/EP

[875] Search Of An Upper Bound For The Number Of Constituent Quarks From E+ E- Annihilation V. Roberto, C. Verzegnassi (Trieste U. and INFN, Trieste). Jul 1981. 13 pp. Published in Lett.Nuovo Cim. 31 (1981) 317 Print-81-0520 (TRIESTE)

[876] Special Properties of the Vacuum Polarization Analytic Function in Quantum Chromodynamics C. Verzegnassi (Trieste U. and INFN, Trieste). Jul 1981. 30 pp. Published in Nuovo Cim. A64 (1981) 269 Print-81-0521 (TRIESTE)

[877] (Hollik 29.) S. Eidelman, F. Jegerlehner, Z. Phys. C 67, 585 (1995)

[878] (Hollik 42.) F. Jegerlehner, IVth International Symposium on Radiative Corrections, Barcelona, September 1998 (to appear in the 1998 proceedings, ed. J. Sola‘);

[879] (Hollik 42.) F. Jegerlehner, O.V. Tarasov, hep-ph/9809485

[880] (Hollik 46.) J. Fleischer, F. Jegerlehner, O.V. Tarasov, Phys. Lett. B 319, 249 (1993)

[881] (Hollik 73.) J. Fleischer, F. Jegerlehner, P. Raczka, O.V. Tarasov, Phys. Lett. B 293, 437 (1992);

[882] F. Jegerlehner, Vector Boson Parameters: Scheme Dependence and Theoretical Uncertainties, Z.Phys. C32 (1986) 425, Erratum: Z.Phys. C38 (1988) 519, BI-TP-86-08,

[883] F. Jegerlehner, Hadronic Contributions to Electroweak Parameter Shifts: A Detailed Analysis, Z.Phys. C32 (1986) 195, (Bielefeld) BI-TP 85/28

[884] F. Jegerlehner, Radiative Z^0 and $W^\pm$ Decays: Precise Predictions From the Standard Model, Z.Phys. C26 (1985) 629, (Bielefeld) BI-TP-1984-6,

[885] F. Jegerlehner, Electroweak Radiative Corrections In The Higgs Sector, Published in In *Trieste 1983, Proceedings, Radiative Corrections In $SU(2)_\times U(1)$, 237-287; and Bielefeld Univ. - BI-TP-83-22 (83,REC.NOV.) NONCONSEC. PAG BI-TP-83-22, C83-06-06.1 Presented at Conference: C83-06-06.1 (Trieste Topical Conf.1983:0237), p.237-287

[886] J. Fleischer, F. Jegerlehner, Radiative Corrections to Higgs Production by $e^+e^- \to ZH$ in the Weinberg-Salam Model, Nucl.Phys. B216 (1983) 469-492, (Bielefeld) BI-TP-82-12,

[887] J. Fleischer, F. Jegerlehner, Radiative Corrections to Higgs Decays in the Extended Weinberg-Salam Model, Phys.Rev. D23 (1981) 2001-2026, (Bielefeld) BI-TP-80-18,

[888] R. Kleiss, Hard Bremsstrahlung In $e^+e^- \to \mu^+\mu^-$: Matching Theory And Experiment R.

Kleiss (CERN). 1986. Published in In *Ellis, J. (Ed.), Peccei, R.d. (Ed.): Physics At Lep, Vol. 1*, 153-171

[889] R. Kleiss, W. James Stirling, Cross-sections for the Production of an Arbitrary Number of Photons in Electron - Positron Annihilation, Phys.Lett. B179 (1986) 159-163, CERN-TH-4475/86,

[890] R. Kleiss, W. James Stirling, S.D. Ellis, A New Monte Carlo Treatment of Multiparticle Phase Space at High-energies, Comput.Phys.Commun. 40 (1986) 359, CERN-TH-4299/85,

[891] R. Kleiss, W. James Stirling, Spinor Techniques for Calculating $p\bar{p} \to W^{\pm}/Z^0$ + Jets, Nucl.Phys. B262 (1985) 235-262, CERN-TH-4186-85,

[892] Ronald Kleiss, The Cross-section for $e^+e^- \to e^+e^-e^+e^-$, Nucl.Phys. B241 (1984) 61, PRINT-84-0228 (LEIDEN),

[893] Ronaldus H.P. Kleiss, Monte Carlo Simulation Of Radiative Processes In Electron - Positron Scattering, Leiden U. preprint June 1982, RX-988 (LEIDEN), INIS-mf-7671

[894] (Hollik 79.) S. Jadach, M. Skrzypek, Z. Phys. C 49, 584 (1991);

[895] (Hollik 80.) S. Jadach, O.Nicrosini, in Physics at LEP 2, CERN 96-01, Vol. 1, eds. G. Altarelli, T. Sjostrand, F. Zwirner

[896] (Hollik 95.) S. Jadach et al., Phys. Lett. B 417, 326 (1998)

[897] (Hollik 95.) S. Jadach et al, contributed paper to ICHEP98, abstract 823 (PS1)

[898] Stanislaw Jadach, QED Radiative Corrections, Monte Carlo and Spin: The Case of the $\tau^+\tau^-$ Pair Production in e^+e^- Annihilation. Parts 1 and 2, Acta Phys.Polon. B16 (1985) 1007

[899] Stanislaw Jadach, Z. Was, QED $\mathcal{O}(\alpha^3)$ Radiative Corrections To The Reaction $e^+e^- \to \tau^+\tau^-$ Including Spin And Mass Effects, Acta Phys.Polon. B15 (1984) 1151, Erratum: Acta Phys.Polon. B16 (1985) 483

[900] Stanislaw Jadach, Z. Was, Monte Carlo Simulation of the Process $e^+e^- \to \tau^+\tau^-$ Including Radiative $\mathcal{O}(\alpha^3)$ QED Corrections, Mass and Spin, Comput.Phys.Commun. 36 (1985) 191-211, TPJU-14-83,

[901] G. Altarelli, R. Barbieri and S. Jadach, Nucl. Phys.B369 (1992) 3 [Erratum-ibid. B376 (1992) 444];

[902] (Hollik 46.) R. Barbieri, M. Beccaria, P. Ciafaloni, G. Curci, A. Vicere, Phys. Lett. B 288, 95 (1992);

[903] (Hollik 46.) R. Barbieri, M. Beccaria, P. Ciafaloni, G. Curci, A. Vicere, Nucl. Phys. B 409, 105 (1993);

[904] (Hollik 137.) G. Altarelli, R. Barbieri, F. Caravaglios, Phys. Lett. B 314, 357 (1993);

[905] Riccardo Barbieri, Michele Caffo, E. Remiddi, S. Turrini, D. Oury, The Anomalous Magnetic Moment Of The Electron In Qed: Some More Sixth Order Contributions In The Dispersive Approach, Nucl.Phys. B144 (1978) 329-348, IFUB 78/7,

[906] Riccardo Barbieri, E. Remiddi, Effective Coupling Constant Expansion of the Muon Anomalous Magnetic Moment, Phys.Lett. 57B (1975) 273-276, CERN-TH-2012,

[907] Riccardo Barbieri, Michele Caffo, E. Remiddi, A Sixth Order Contribution to the electron Anomalous Magnetic Moment, Phys.Lett. 57B (1975) 460-462, PTENS 75/4,

[908] Riccardo Barbieri, E. Remiddi, Electron and Muon $\frac{g-2}{2}$ from Vacuum Polarization Insertions, Nucl.Phys. B90 (1975) 233-266, CERN-TH-1895,

[909] Riccardo Barbieri, Michele Caffo, E. Remiddi, A Contribution to Sixth Order electron and Muon Anomalies. 3., Lett.Nuovo Cim. 9 (1974) 690, CERN-TH-1802,

[910] Riccardo Barbieri, E. Remiddi, Sixth Order electron and Muon (G-2) / 2 from Second Order Vacuum Polarization Insertion, Phys.Lett. 49B (1974) 468-470, CERN-TH-1801,

[911] Riccardo Barbieri, E. Remiddi, Infra-red divergences and adiabatic switching. 2. radiative corrections to Coulomb scattering, Nuovo Cim. A15 (1973) 162-172,

[912] Riccardo Barbieri,E. Remiddi, Infra-red divergences and adiabatic switching. fourth order vacuum polarization, Nuovo Cim. A13 (1973) 99-119,

[913] Riccardo Barbieri, Michele Caffo, E. Remiddi, Fourth-order charge radius of the muon and its contribution to the lamb shift, Lett.Nuovo Cim. 7S2 (1973) 60-62, Lett.Nuovo Cim. 7 (1973) 60-62,

[914] Riccardo Barbieri, J.A. Mignaco, E. Remiddi, Electron form factors up to fourth order. 2., Nuovo Cim. A11 (1972) 865-916,

[915] Riccardo Barbieri, Michele Caffo, E. Remiddi, A contribution to sixth-order electron and muon anomalies. 2., Lett.Nuovo Cim. 5S2 (1972) 769-773, Lett.Nuovo Cim. 5 (1972) 769-773,

[916] Riccardo Barbieri, J.A. Mignaco, E. Remiddi, Electron form-factors up to fourth order. 1., Nuovo Cim. A11 (1972) 824-864,

[917] Riccardo Barbieri, J.A. Mignaco, E. Remiddi, Fourth-order radiative corrections to electron-photon vertex and the Lamb-shift value, Nuovo Cim. A6 (1971) 21-28,

[918] Riccardo Barbieri, J.A. Mignaco, E. Remiddi, On the fourth-order radiative corrections to the electron-photon vertex, Lett.Nuovo Cim. 3S1 (1970) 588-591, Lett.Nuovo Cim. 3 (1970) 588-591,

[919] Riccardo Barbieri, L. Maiani, Renormalization of the Electroweak rho Parameter from Supersymmetric Particles, Nucl.Phys. B224 (1983) 32, ROME-343-1983,

[920] Riccardo Barbieri, L. Maiani, The Muon Anomalous Magnetic Moment in Broken Supersymmetric Theories, Phys.Lett. 117B (1982) 203-207, SNS-6/1982,

[921] Riccardo Barbieri, J. Sucher, General Theory of Radiative Corrections to Atomic Decay Rates, Nucl.Phys. B134 (1978) 155-168, UGVA-DPT 1977/09-151,

[922] Riccardo Barbieri, Radiative Corrections To Electron Form-factors, Cargese Lect.Phys. 7 (1977) 407-420, Conference: C72-07-02

[923] G. Altarelli and R. Barbieri, Phys. Lett. B253 (1991) 161;

[924] (Hollik 35.) J.H. Kuhn, M. Steinhauser, hep-ph/9802241

[925] (Hollik 38.) K.G. Chetyrkin, J.H. Kuhn, M. Steinhauser, Phys. Lett. B 371, 93 (1996);

[926] (Hollik 38.) K.G. Chetyrkin, J.H. Kuhn, M. Steinhauser, Nucl. Phys. B 482, 213 (1996);

[927] (Hollik 38.) K.G. Chetyrkin, J.H. Kuhn, M. Steinhauser, Nucl. Phys. B 505, 40 (1997);

[928] (Hollik 38.) K.G. Chetyrkin, R. Harlander, J.H. Kuhn, M. Steinhauser, Nucl. Phys. B 503, 339 (1997)

[929] (Hollik 54.) J.H. Kuhn, talk at ICHEP98 (PS1).

[930] (Hollik 70.) K.G. Chetyrkin, J.H. Kuhn, Phys. Lett. B 248, 359 (1990)

[931] (Hollik 70.) K.G. Chetyrkin, J.H. Kuhn, Phys. Lett. B 406, 102 (1997);

[932] (Hollik 70.) K.G. Chetyrkin, J.H. Kuhn, A. Kwiatkowski, Phys. Lett. B 282, 221 (1992);

[933] (Hollik 71.) B.A. Kniehl, J.H. Kuhn, Phys. Lett. B 224, 229 (1990);

[934] (Hollik 71.) B.A. Kniehl, J.H. Kuhn, Nucl. Phys. B 329, 547 (1990);

[935] (Hollik 71.) K.G. Chetyrkin, J.H. Kuhn, Phys. Lett. B 307, 127 (1993);

[936] (Hollik 3.) UA2 Collaboration, J. Alitti et al., Phys. Lett. B 276, 354 (1992);

[937] (Hollik 3.) CDF Collaboration, F. Abe et al., Phys. Rev. Lett. 65, 2243 (1990);

[938] (Hollik 3.) CDF Collaboration, F. Abe et al., Phys. Rev. D 43, 2070 (1991);

[939] (Hollik 3.) CDF Collaboration, F. Abe et al., Phys. Rev. Lett. 75, 11 (1995);

[940] (Hollik 3.) CDF Collaboration, F. Abe et al., Phys. Rev. D 52, 4784 (1995);

[941] (Hollik 4.) CDF Collaboration, F. Abe et al., Phys. Rev. Lett. 74, 2626 (1995);

[942] Tevatron Run 2; CDF Collaboration, CDF Note 8384; D0 Collaboration D0 Note 5227; To see the limits, study $2-\sigma$ $LLR_{Background}$ yellow area vs. $LLR_{Observed}$ solid black line.

[943] CDF collaboration, D0 Collaboration, and Tevatron New Physics, Higgs Working Group, e-print arXiv:1207.0449

[944] Joint CDF/D0 1996 proposal to FNAL PAC to upgrade the CDF and D0 detectors to search for a $\sim 100GeV$ BEH scalar; FNAL PAC proposal 1234567 March 1996.

[945] (Hollik 61.) G. Degrassi, P. Gambino, A. Vicini, Phys. Lett. B 383, 219 (1996);

[946] (Hollik 73.) G. Degrassi, Nucl. Phys. B 407, 271 (1993);

[947] (Hollik 126.) G. Degrassi, G.F. Giudice, hep-ph/9803384 (1998)

[948] P. A. Grassi, Nucl. Phys. B 560 (1999) 499 [arXiv:hep-th/9908188].

[949] P. A. Grassi, T. Hurth and M. Steinhauser, Annals Phys. 288 (2001) 197 [arXiv:hep-ph/9907426]

[950] P. A. Grassi, T. Hurth and M. Steinhauser, Nucl. Phys. B 610 (2001) 215 [arXiv:hep-ph/0102005]

[951] R. Ferrari and P. A. Grassi, Phys. Rev. D 60 (1999) 065010 [arXiv:hep-th/9807191];

[952] R. Ferrari, P. A. Grassi and A. Quadri, Phys. Lett. B 472 (2000) 346 [arXiv:hep- th/9905192];

[953] Mario Greco, Bhabha Scattering Near the Z(0), Phys.Lett. B177 (1986) 97-105, LNF-86/18-P,

[954] Mario Greco, Higher Order Em Radiative Corrections To $e^+e^- \to \mu^+\mu^-$ Around The Z0, In *Ellis, J. (Ed.): Peccei, R.d. (Ed.): Physics At Lep, Vol. 1*, 182-186 and Frascati Infn LNF-85-014(R) (85,REC.SEP.), LNF-85/14-R

[955] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Radiative Corrections to $e^+e^- \to \mu^+\mu^-$ Around the Z0, Nucl.Phys. B171 (1980) 118, Erratum: Nucl.Phys. B197 (1982) 543, LNF-80/1-P,

[956] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Radiative Corrections To $e^+e^- \to \mu^+\mu^-$ Near The Z0 Resonance With Transversely Polarized Beams, (Frascati). Sep 1979, LNF-79/63-R, ECFA-LEP-SSG/7/19

[957] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Radiative Corrections To $e^+e^- \to \mu^+\mu^-$ Near The Z0 Resonance, (Frascati) Mar 1979, LNF-79/20-R

[958] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Weak and Radiative Asymmetries, Phys.Lett. 80B (1979) 390-392, (Frascati) LNF-78/33-P,

[959] Mario Greco, A.F. Grillo, Radiative Asymmetry in $e^+e^- \to \mu^+\mu^-$ Near a Narrow Resonance with Polarized Beams. Lett.Nuovo Cim. 15 (1976) 174, (Frascati) LNF-75/47-P,

[960] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Radiative Corrections for Colliding Beam Resonances, Nucl.Phys. B101 (1975) 234-262, (Frascatoi) LNF-75/23-P,

[961] Mario Greco, G. Pancheri-Srivastava, Y. Srivastava, Radiative Effects for Resonances with Applications to Colliding Beam Processes, Phys.Lett. 56B (1975) 367-372, (Frascati) LNF-75/9-P

[962] A. Bramon, E. Etim, Mario Greco, Hadronic contributions to the muon anomalous magnetic moment, Phys.Lett. 39B (1972) 514-516,

[963] (Hollik 12.) K.I. Aoki, Z. Hioki, R. Kawabe, M. Konuma, T. Muta, Suppl. Prog. Theor. Phys. 73,1 (1982);

[964] (Hollik 12.) Z. Hioki, Phys. Rev. Lett. 65, 683 (1990)

[965] (Hollik 12.) Z. Hioki, Z. Phys. C 49, 287 (1991)

[966] Zenro Hioki, Role of Heavy Fermions and Heavy Higgs Scalars in the Electroweak Correction to the M (W) - M(Z) Relation, Nucl.Phys. B229 (1983) 284, KUNS-690,

[967] Logarithmic and Heavy Quark Corrections to e+eW+WeeWW Including Off-shell Effects in the Final States B. Grzadkowski, Zenro Hioki

(Munich, Max Planck Inst.). Mar 1987. 7 pp. Published in Phys.Lett. B197 (1987) 213-219 MPI-PAE/PTh-24/87

[968] (Hollik 8.) M. Consoli, One Loop Corrections to $e^+e^- \to e^+e^-$ in the Weinberg Model, Nucl.Phys. B160 (1979) 208-252; Print-79-0418 (UTRECHT),

[969] (Hollik 13.) M. Consoli, S. LoPresti, L. Maiani, Nucl. Phys. B 223, 474 (1983)

[970] (Hollik 23.) F. Antonelli, M. Consoli, G. Corbo, Phys. Lett. B 91, 90 (1980);

[971] (Hollik 23.) F. Antonelli, G. Corbo (Rome U.), M. Consoli, O. Pellegrino, The Masses of the Intermediate Vector Bosons, Nucl.Phys. B183 (1981) 195-222,

[972] (Hollik 18.) G. Passarino, R. Pittau, Phys. Lett. B 228, 89 (1989);

[973] (Hollik 91.) G. Passarino, Acta Phys. Polon. 28, 635 (1997);

[974] (Hollik 62.) S. Bauberger, G. Weiglein, Nucl. Instrum. Meth. A 389, 318 (1997);

[975] (Hollik 62.) S. Bauberger, G. Weiglein, Phys. Lett. B 419, 333 (1997)

[976] (Hollik 63.) G. Weiglein, Acta Phys. Polon. B 29, 2735 (1998)

[977] (Hollik 91.) S. Dittmaier, D. Schildknecht, G. Weiglein, Phys. Lett. B 386, 247 (1996);

[978] (Hollik 140.) A. Djouadi, P. Gambino, S. Heinemeyer, W. Hollik, C. Junger, G. Weiglein, Phys. Rev. Lett. 78, 3626 (1997);

[979] (Hollik 140.) A. Djouadi, P. Gambino, S. Heinemeyer, W. Hollik, C. Junger, G. Weiglein, Phys. Rev. D 57, 4179 (1998)

[980] (Hollik 112.) A. Ghinculov, Nucl. Phys. B 455, 21 (1995)

[981] (Hollik 113.) T. Binoth, A. Ghinculov, J.J. van der Bij, Phys. Rev. D 57, 1487 (1998);

[982] (Hollik 113.) T. Binoth, A. Ghinculov, J.J. van der Bij, Phys. Lett. B 417, 343 (1998);

[983] (Hollik 113.) T. Binoth, A. Ghinculov, J.J. van der Bij, Rev. Lett. 75, 790 (1995);

[984] (Hollik 113.) T. Binoth, A. Ghinculov, J.J. van der Bij, Phys. Rev. D 54, 3137 (1996);

[985] (Hollik 114.) A. Ghinculov, Phys. Lett. B 337, 137 (1994);

[986] (Hollik 114.) A. Ghinculov, Phys. Lett. B 346, 426 (1995);

[987] E.A. Kuraev, A. Schiller, V.G. Serbo, The High-energy Double Photon Bremsstrahlung Process $e^+e^- \to e^+e^-\gamma\gamma$ at Small Angles for Arbitrary Polarizations of the Particles, Z.Phys. C30 (1986) 237-246,

[988] E.A. Kuraev, A.N. Peryshkin, Processes $e^+e^- \to \mu^+\mu^-\gamma\gamma$ And $e^+e^- \to e^+e^-\gamma\gamma$ With Emission Of Particles At Large Angles In The High-energy Limit. (in Russian), Yad.Fiz. 42 (1985) 1195-1203

[989] A.D. Bukin, E.A. Kuraev, Correction To The Cross-section Of The Reaction $e^+e^- \to e^+e^-\gamma$ In The Ultraviolet Limit, Yad.Fiz. 42 (1985) 678-679

[990] E.A. Kuraev, A. Schiller, V.G. Serbo PROCESSES $\gamma\gamma \to \mu^+\mu^-e^+e^-$, $\gamma\gamma \to e^+e^-e^+e^-$ and $\gamma\gamma \to \pi^+\pi^-e^+e^-$ FOR HIGH-ENERGY $\gamma\gamma$ BEAMS Phys.Lett. 134B (1984) 455-458, KMU-HEP 83-08,

[991] E.A. Kuraev, A. Schiller, V.G. Serbo, The $\gamma\gamma \to \mu^+\mu^-e^+e^-$ and $\gamma\gamma \to e^+e^-e^+e^-$ Reactions As Main Calibration Processes For High-energy Gamma Gamma Colliding Beams, Nucl.Phys. B256 (1985) 189-210,

[992] V.N. Baier, E.A. Kuraev, Victor S. Fadin, Valery A. Khoze, Inelastic Processes in Quantum Electrodynamics at High-Energies Phys.Rept. 78 (1981) 293-393, Inelastic Processes in QED at High-energies (Radiative Corrections, Methods of Calculations) (In Russian), Nov 1980, LENINGRAD-80-618

[993] S.I. Eidelman, E.A. Kuraev, V.S. Panin, Processes $e^+e^- \to \mu^+\mu^-\gamma$, $e^+e^- \to e^+e^-\gamma$ and $e^+e^- \to \gamma\gamma\gamma$ With Emission Of Final Particles At Large Angles, Nucl.Phys. B148 (1979) 245-252,

[994] S.I. Eidelman, E.A. Kuraev, Radiative Corrections in Experiments with e+ e- Colliding Beams, Phys.Lett. 80B (1978) 94-98,

[995] S.I. Eidelman, E.A. Kuraev, e+ e- Annihilation Into Two and Three Photons at High-Energy, Nucl.Phys. B143 (1978) 353-364,

[996] E.A. Kuraev, G.V. Meledin, QED Distributions for Hard Photon Emission in $e^+e^- \to \mu^+\mu^-\gamma$ Nucl.Phys. B122 (1977) 485-492,

[997] E.A. Vinokurov, E.A. Kuraev, N.P. Merenkov, Radiative corrections to e+ e- pair production induced by high energy photons incident on electrons or nuclei (In Russian), . 1974. 10 pp. Zh.Eksp.Teor.Fiz. 66 (1974) 1916-1925

[998] E.A. Kuraev, L.N. Lipatov , Bremsstrahlung mechanism of e+ e- and mu+ mu- pair production in electron colliding beams (In Russian), Yad.Fiz. 20 (1974) 112-121

[999] E.A. Kuraev, L.N. Lipatov, N.P. Merenkov, Victor S. Fadin, Valery A. Khoze, Double bremsstrahlung in the same direction in e+ e- colliding beams, Sov.J.Nucl.Phys. 19 (1974) 164-167, Yad.Fiz. 19 (1974) 331-339

[1000] R.M. Dzhilkibaev, Victor S. Fadin, E.A. Kuraev, Valery A. Khoze, Radiation of a photon in production of an e+ e- pair by a high-energy photon in the field of a nucleus, Sov.J.Nucl.Phys. 19 (1974) 353-355, Yad.Fiz. 19 (1974) 699-703

[1001] E.A. Kuraev, L.N. Lipatov, N.P. Merenkov, High-energy behaviour of total cross-sections of e+ e- scattering and the lamb shift (In Russian), Yad.Fiz. 18 (1973) 1075-1091

[1002] E.A. Kuraev, L.N. Lipatov, M.I. Strikman, Identity of electrons in the final state in pair production in colliding e+ e- beams (In Russian), Yad.Fiz. 18 (1973) 1270-1282

[1003] E.A. Kuraev, L.N. Lipatov, Electron and muonic production in e- e- and e+ e- colliding beams (In Russian), Yad.Fiz. 16 (1972) 1060-1077

[1004] E.A. Kuraev, L.N. Lipatov, Total cross-section for electron and muon pair production in colliding electron beams (In Russian), Pisma

Zh.Eksp.Teor.Fiz. 15 (1972) 229-232

[1005] E.A. Kuraev, G. Foti, High-energy asymptotics of the Compton effect for large and small angles in the sixth order of perturbation theory (In Russian), Ukr.Fiz.Zh.(Ukr.Ed.) 16 (1971) 253-260

[1006] E.A. Kuraev, M.M. Nesterov, Yu.E. Olshanskii, Asymptotics of total annihilation cross-section of e+ e- pair into any number of photons and any number of mu+ mu- pairs at high energy (In Russian), Yad.Fiz. 13 (1971) 825-831

[1007] (Hollik 90.) J. Erler, P. Langacker, hep-ph/9809352; hep-ph/9801422

[1008] P. Langacker and Mingxing Luo, Phys. Rev. D 44 (1 August 1991) 817 (C6).