

Library for Electroweak Radiative corrections, DIZET v 6.45

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ZFITTER

ZFITTER

is a Fortran package for the evaluation of radiative corrections (quantum corrections), as predicted in the Standard Model of elementary particles, to a variety of observable quantities, notably those related to the Z-boson resonance peak.

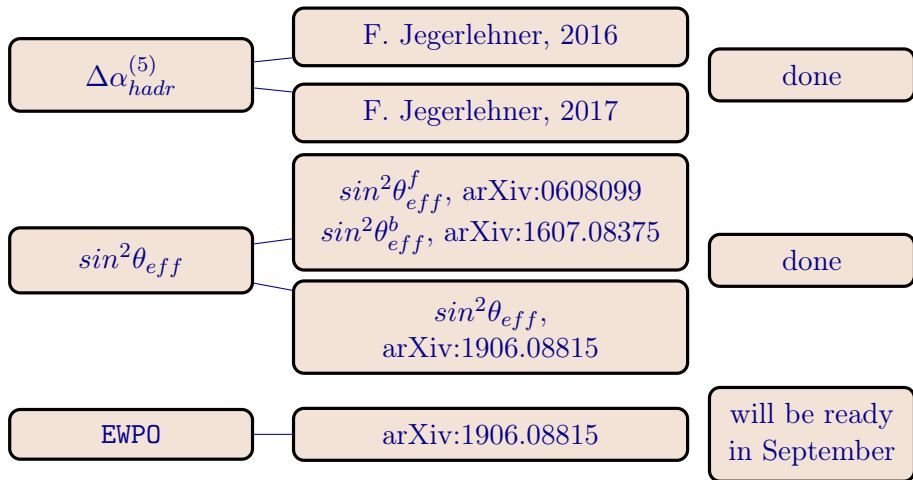
The homepage of the **ZFITTER** project and collaboration is <http://sanc.jinr.ru/users/zfitter/>

DIZET

The Fortran package **DIZET**, a library for the calculation of electroweak radiative corrections, is part of the **ZFITTER** distribution. It can also be used in a standalone mode.

KKMC uses **DIZET** library for the calculation of higher order corrections in the electroweak/QCD Standard Model.

DIZET v 6.45



DIZET v 6.45, hadr5

We introduce new options for the flag IHVP:

IHVP	Realization	Result at M_Z
1	Jegerlehner(1995)	2.8039e-2
4	Jegerlehner(2016)	2.7586e-2
5	Jegerlehner(2017)	2.7576e-2

Note: Jegerlehner(2017) code provides statistical and systematic errors estimation.

Status of hadronic vacuum polarization see in talk by **F. Jegerlehner** 'Determination of the QED coupling constant at the Z scale' at 11th FCC-ee workshop and **F. Jegerlehner**, "Variations on Photon Vacuum Polarization," arXiv:1711.06089 [hep-ph].

DIZET v 6.45, $\sin^2\theta_{eff}$

We introduce new option for the flag IAMT4:

IAMT4	Description
6	$\sin^2\theta_{eff}^{lept}$ with fermionic two-loop correction by Awramik, Czakon, Freitas, Weiglein (april 2004)
7	$\sin^2\theta_{eff}^f$ & $\sin^2\theta_{eff}^b$ with complete two-loop correction according arXiv:hep-ph/0608099 & arXiv:1607.08375
8	$\sin^2\theta_{eff}$ with complete two-loop correction according arXiv:1906.08815

DIZET v 6.45, $\sin^2\theta_{eff}$

We use for comparison $M_Z=91.1876$ GeV, $M_H=125.10$ GeV,
 $m_t=172.9$ GeV and $\alpha_s=0.1181$

Channel	$\sin^2\theta_{eff}$		
	IAMT4=6	IAMT4=7	IAMT4=8
$\nu, \bar{\nu}$	0.231307	0.231311	0.231276
$e+, e-$	0.231688	0.231688	0.231657
$\mu+, \mu-$	0.231688	0.231688	0.231657
$\tau+, \tau-$	0.231688	0.231688	0.231657
u, \bar{u}	0.231582	0.231575	0.231551
d, \bar{d}	0.231454	0.231463	0.231424
c, \bar{c}	0.231582	0.231575	0.231551
s, \bar{s}	0.231454	0.231463	0.231424
b, \bar{b}	0.233131	0.232893	0.232893

DIZET v 6.45, EWPO

Paper '**Electroweak pseudo-observables and Z-boson form factors at two-loop accuracy**' of Ievgen Dubovyk, Ayres Freitas, Janusz Gluza, Tord Riemann and Johann Usovitsch ([arXiv:1906.08815](https://arxiv.org/abs/1906.08815)) provides fitting formula for **Z-boson decay widths, branching ratios and cross-section.**

It would be implemented in DIZET 7.00 in September!