Contribution ID: **11** Type: **not specified**

New dynamical gauges of the SM of EW interactions

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\begin{document}
\title{New dynamical gauges of the SM of EW interactions }
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\maketitle
In this talk it shows that new gauge fixings of the SM of EW interactions are **dynamically** generated from the theory itself, which can be tested by LHC experiments. A new mechanism of chiral symmetry breaking, inspired
by Weinberg's second sum rule, \(m^2_a=2m^2_\rho\), is proposed.
This new mechanism is found from a chiral field theory of pseudoscalar, vector, and axial-vector mesons,
in which mesons are coupled to quarks. Quarks have dynamical quark mass.
The vacuum polarization of the a_1 field which is coupled to axial-vector current of massive quark is expressed as
\[\Pi_{\mu\nu}^{ij}(q^2)=\delta_{ij}\{F_1(q^2)(q_\mu q_\nu-q^2 g_{\mu\nu})+F_2(q^2)q_\mu q_\nu+{1\over2}\Delta m^2 g_{\mu\nu}\}.\]
Therefore, both the gauge fixing term(F_2) and the mass term of a_1 field are dynamically generated from dynamical quark mass. These two terms lead to
\[(1-{1\over 2\pi^2 g^2})m^2_a=2m^2_\rho,\]
where g is a universal constant of the theory. This formula fits data better.
The two new terms are treated **nonperturbatively**.
Comparing with QCD and QED, theory of EW interactions have both axial-vector currents and charged vector currents of massive fermions. The vacuum polarizations of Z-filed and W-field have both gauge fixing and mass terms.
They are dynamically generated from fermion masses and they should be treated nonperturbatively.
In this talk only the gauge fixing terms dynamically generated from fermion masses are discussed.
The propergators of Z- and W- fields are derived as
\[\Delta_{\mu\nu}^Z=
\frac{1}{q^2-m^2_Z}\{-g_{\mu\nu}+(1+\frac{1}{2\xi_Z})\frac{q_\mu q_\nu}{
q^2-m^2_{\phi^0}}\}\]
where \(m_{\phi^0}=m_t e^{\frac{m^2_z}{m^2_t}{16\pi^2\over3\bar{g}^2}+1}
=3.78\times10^{14}GeV,\;\;\;
\xi_Z=-\frac{m^2_Z}{2m^2_{\phi^0}}=-1.18\times10^{-25}\).
\[\Delta^W_{\mu\nu}=
\frac{1}{q^2-m^2_W}\{-g_{\mu\nu}+(1+\frac{1}{2\xi_W})\frac{q_\mu q_\nu}{
q^2-m^2_{\phi_W}}\}\]
where \(m_{\phi_W}=m_t e^{{16\pi^2\over3g^2}{m^2_W\over m^2_t}}
=9.31\times10^{13}GeV,\;\;\;
\xi_W=-{m^2_W\over2m^2_{\phi_W}}=-3.73\times10^{-25}\).
Top quark plays dominant role in the determination of these propagators.
These results are independent of spontaneously chiral symmetry breaking. The effects of these propergators can be found in loop diagrams and can be tested by LHC experiments.
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Track Classification: Electroweak Physics [W/Z]