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Diagrammatic one-loop renormalization within the EChL in the Rxi gauges and applications to scattering and decays

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Effective field theories (EFTs) are an incredibly powerful tool in order to study and understand the true nature of the symmetry breaking sector dynamics of the Standard Model. The most general EFT, appropriate in the case that the new ultraviolet physics beyond the SM be strongly interacting, is the Electroweak Chiral Lagrangian (EChL) or Higgs Effective field theory (HEFT). We work here just with the bosonic sector and assume the fermion sector is as in the SM. In this talk, using diagrammatic methods, I will present a detailed computation of the generated divergencies at one-loop level corresponding to all 1PI relevant for Higgs decays and Vector Boson Scattering and the corresponding renormalization program within the EChL in the covariant Rxi gauges for the first time. I present the list of the needed counterterms to provide renormalized 1PI functions of 2, 3 and 4 legs and extract the corresponding renormalization of the EChL coefficients. As an illustration of the applicability of these results, I show both Higgs to photon+photon and photon+Z decays and the WZ scattering amplitude with longitudinal polarized bosons. Also, a comparison with the SM case is shown.

Presenter: MORALES, Roberto

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