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Effective theories and resonances in strongly-coupled electroweak symmetry breaking scenarios

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Due to the current gap between the electroweak scale and the scale of New Physics, the use of electroweak effective approaches is justified. A linear realization of the electroweak symmetry breaking with the Higgs forming a doublet is a first possibility (SMEFT), but we prefer to use the more general non-linear realization, being the Higgs a scalar singlet with independent couplings (EWET or HEFT). Note that the EWET includes the SMEFT as a particular case. We construct the effective Lagrangians at low energies (including only the SM fields) and at high energies (including also a set of resonances). Considering the high scales of these resonances, a good way to handle with them is by searching for their imprints in the Low Energy Constants (LECs) of the EWET at energies lower that the resonances masses. We also relate our general approach with specific examples present in the literature.

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