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Strongly interacting EWSBS resonances in the diphoton channel

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We present the inelastic scattering between $\gamma\gamma$ into/out of a strongly interacting EWSBS satisfying unitarity. The matrix elements $V_LV_L \to V_LV_L$, $V_LV_L \to hh$, $hh \to hh$, $V_LV_L \to \gamma\gamma$ and $hh \to \gamma\gamma$ are al computed to NLO in perturbation theory with the Nonlinear Effective Theory of the EWSBS (within the Equivalence Theorem).
Describing the EWSBS itself requires seven parameters: two LO parameters (a, b) and the NLO counterterms (a_4, a_5, g, d, e). The coupling with the $\gamma\gamma$ state requires four additional ones:
$c_{\gamma\gamma}$ and $a1$, $a2$, $a3$, though in the combination $a_1 - a_2 + a_3$ only, so the number of total coefficients is 9.

By means of a modified version of the IAM and N/D unitarization procedures, we study the prospects for detecting any new strong-EWSBS resonances in the energy range 0.75-3TeV, within reach of the LHC. Our basic assumption is that the couplings with $\gamma\gamma$ are feeble as they are governed by the electromagnetic $\alpha_{\rm ew}$, while the EWSBS is strongly interacting.

There are two cases of interest. First, the detection of resonances in the diphoton channel coming from the strong rescattering of V_LV_L states (photons in the final state). And second, the possible study of $\gamma\gamma$ scattering at the LHC by means of the new forward detectors (CMS-TOTEM and ATLAS-AFP) that tag the elastically scattered proton (photons in the initial state). Of course, this would be also a goal for the ILC and its future detectors.

Summary

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