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Top partner-resonance interplay in a composite Higgs framework

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Guided us by the scenario of weak scale naturalness and the possible existence of exotic resonances, we have explored in a $SO(5)$ Composite Higgs set-up the interplay among three matter sectors: elementary, top partners and vector resonances. We parametrise it through explicit interactions of spin-1 $SO(4)$ -resonances, coupled to the $SO(5)$ -invariant fermionic currents and tensors presented in this work. Such invariants are built upon the Standard Model fermion sector as well as top partners sourced by the unbroken $SO(4)$. The mass scales entailed by the top partner and vector resonance sectors will control the low energy effects emerging from our interplaying model. Its phenomenological impact and parameter spaces have been considered via flavour-dijet processes and electric dipole moments bounds. Finally, the strength of the Nambu-Goldstone symmetry breaking and the extra couplings implied by the top partner mass scales are measured in accordance with expected estimations.

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