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Searching for heavy resonances via oblique parameters in non-linear effective frameworks

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Abstract

Within the framework of a general non-linear effective field theory describing the electroweak symmetry breaking, we perform a detailed analysis of the next-to-leading contributions to the electroweak oblique parameters S and T from hypothetical heavy resonance states strongly coupled to Standard Model fields. This work extends our previous results by including parity-odd operators in the effective Lagrangian, contributions from fermionic cuts, and up-to-date experimental constraints. We demonstrate that in strongly-coupled ultraviolet completions satisfying both Weinberg Sum Rules —as is the case in asymptotically free gauge theories— the vector and axial-vector resonance masses are constrained to lie above 10 TeV. Conversely, scenarios allowing for lighter resonances with masses between 2 and 10 TeV necessarily imply a violation of the second Weinberg Sum Rule.

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