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Oblique parameters at next-to-leading order within electroweak strongly-coupled scenarios: constraining heavy resonances

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Abstract

Using a general (non-linear) effective field theory description of the Standard Model electroweak symmetry breaking, we analyse the impact on the electroweak oblique parameters of hypothetical heavy resonance states strongly coupled to the SM particles. We present a next-to-leading order calculation of S and T that updates and generalizes our previous results, including P-odd operators in the Lagrangian, fermionic cuts and the current experimental bounds. We demonstrate that in any strongly-coupled underlying theory where the two Weinberg Sum Rules are satisfied, as happens in asymptotically free gauge theories, the masses of the heavy vector and axial-vector states must be heavier than 7 TeV. Lighter resonances with masses around 2-3 TeV are only possible in theoretical scenarios where the 2nd Weinberg Sum Rule is not fulfilled.

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