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Correlating h→μ+μ− to the Anomalous Magnetic Moment of the Muon via Leptoquarks

Recently, both ATLAS and CMS measured the decay h→μ+μ−, finding a signal strength with respect to the Standard Model (SM) expectation of 1.2±0.6 and 1.19+0.41+0.17−0.39−0.16, respectively. This measurement is particularly interesting in the context of the existing hints for lepton flavor universality violation (LFUV), since their new physics explanations could be tested in this decay mode. Especially the anomalous magnetic moment of the muon (aμ), where a 3.7σ deviation from the SM theory prediction was observed, is promising since like h→μ+μ− it is a chirality changing transition. Leptoquarks are prime candidates to explain the hints for LFUV, in particular regarding aμ, as they can generate an mt/mμ enhanced contribution. In this letter we calculate and examine the correlations between h→μ+μ− and aμ by studying three distinct scenarios. We find that in two of them effects of several percent are predicted, which could be tested by future precision measurements. The third scenario even displays an enhancement of Br[h→μ+μ−] by more than 50% if one aims at an explanation of aμ at the 2σ level. Hence, the new ATLAS and CMS measurements already provide important constraints on the parameter space of the model.

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