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The old and the new muon g-2 puzzle

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The recent muon g-2 measurement at Fermilab confirms the previous BNL result, hence emphasizing the longstanding discrepancy between the experimental value and the Standard Model (SM) prediction based on the use of eˆ+ eˆ- ⟶ hadrons data to evaluate the leading hadronic vacuum polarization (HVP). This is what I call the "old"muon g-2 puzzle. On the other hand, a recent lattice result by the BMW collaboration shows a tension with the above mentioned SM prediction (this constitutes the "new"g-2 puzzle). The BMWc result has recently been confirmed by other lattice computations, although only concerning a window of the whole energy range integration. In this talk I plan to summarize the overall situation concerning the two muon g-2 puzzles and, in particular, I discuss the possibility that new physics may contribute to the eˆ+ eˆ- ⟶ hadrons cross-section to solve or at least alleviate the new g-2 puzzle.

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