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Some lessons from recent experimental anomalies

Monday, 1 August 2022 09:00 (40 minutes)

Recently there have been two interesting and intriguing experimental results, one on the muon g-2 from Fermilab and one on the W boson mass from CDF. I will discuss some possible implications of these results for new physics, provided that they survive. For muon g-2, I will discuss a relatively new explanation using the loop effects of a heavy axion coupling to leptons and photons. I will provide an updated analysis of the necessary couplings, including two-loop contributions, and show that the new physics operators point to an axion decay constant on the order of 10s of GeV. I will also discuss the challenges to UV complete this explanation. For the W mass, I will discuss the implications using a set of six-dimensional operators in the SM effective field theory and comment on other further indirect tests of the physical origin for this anomalous discrepancy such as the Higgs couplings.

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