Contribution ID: **274** Type: **Oral report**

The W boson Mass and Muon g-2 : Hadronic Uncertainties or New Physics ?

Thursday, 11 August 2022 15:15 (15 minutes)

There are now two single measurements of precision observables that have major anomalies in the Standard Model:
the recent CDF measurement of the W mass shows a 7σ deviation and the Muon $g-2$ experiment at FNAL confirmed a long-standing anomaly, implying a 4.2σ deviation.
%
Doubts regarding new physics interpretations of these anomalies could stem from uncertainties in the common hadronic contributions.
We demonstrate that the two anomalies pull the hadronic contributions in opposite directions by performing electroweak fits in which the hadronic contribution was allowed to float.
%
The fits show that including the $g-2$ measurement worsens the tension with the CDF measurement and conversely that adjustments that alleviate the CDF tension worsen the $g-2$ tension beyond 5σ.
%
This means that if we adopt the CDF W mass measurement, the case for new physics in either the W mass or muon $g-2$ is inescapable regardless of the size of the SM hadronic contributions.
%
Lastly, we demonstrate that a mixed scalar leptoquark extension of the Standard Model could explain both anomalies simultaneously.

Primary author: FOWLIE, Andrew (Nanjing Normal University)

Co-authors: Dr LU, Chih-Ting (Nanjing Normal University); Dr WU, Lei (Nanjing Normal University); Prof. ATHRON, Peter (Nanjing Normal University); WU, Yongcheng (Nanjing Normal University); ZHU, bin (Yantai University)

Presenter: Dr LU, Chih-Ting (Nanjing Normal University)

Session Classification: Parallel Session IX (1)：TeV and BSM Physics

Track Classification: TeV 物理和超出标准模型新物理