## 2019 Meeting of the Division of Particles & Fields of the American Physical Society



Contribution ID: 178

Type: Oral Presentation

## Revisiting the Dark Photon Interpretation of the Muon Anomalous Magnetic Moment

Tuesday 30 July 2019 14:00 (18 minutes)

A massive U(1)' gauge boson known as a "dark photon" or A', has long been proposed as a potential explanation for the discrepancy observed between the experimental measurement and theoretical determination of the anomalous magnetic moment of the muon (g - 2) anomaly. Recently, experimental results have excluded this possibility for a dark photon exhibiting exclusively visible or invisible decays. In this work, we revisit this idea and consider a model where A' couples inelastically to dark matter and an excited dark sector state, leading to a more exotic decay topology we refer to as a semi-visible decay. We show that for large mass splittings between the dark sector states this decay mode is enhanced, weakening the previous invisibly decaying dark photon bounds. As a consequence, A' resolves the g - 2 anomaly in a region of parameter space the thermal dark matter component of the Universe is readily explained. Interestingly, it is possible that the semi-visible events we discuss may have been vetoed by experiments searching for invisible dark photon decays. A reanalysis of the data and future searches may be crucial in uncovering this exotic decay mode or closing the window on the dark photon explanation of the g - 2 anomaly.

Author: MOHLABENG, Gopolang (Brookhaven National Laboratory)
Presenter: MOHLABENG, Gopolang (Brookhaven National Laboratory)
Session Classification: Beyond Standard Model

Track Classification: Beyond Standard Model Physics