Contribution ID: **184** Type: **not specified**

Lepton Flavor Portal Matter -2

Tuesday 9 May 2023 14:15 (15 minutes)

The paradigm of portal matter represents a well-motivated extension to models with kinetic mixing/vector portal dark matter. In previous work, we constructed a simple leptonic portal matter model in which the portal matter fields could mediate a new physics correction to the anomalous magnetic moment of the muon consistent with the observed discrepancy between the measured value for this quantity and the SM prediction. Here, we present a version of this mechanism by constructing a model with an extended dark gauge sector in which SM and portal matter fields exist as members of the same dark gauge multiplets, which provides a natural extension of simple portal matter models. We find a rich phenomenology in this extended model, including nontrivial novel characteristics that do not appear in our earlier minimal construction, and discuss current experimental constraints and future prospects for this model. We find that a multi-TeV muon collider has excellent prospects for constraining or measuring the crucial parameters of this model.

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Session Classification: BSM VII

Track Classification: BSM