

Roadmap of Dark Matter models for Run 3



Contribution ID: 33

Type: **not specified**

Fermionic Portal to Vector Dark Matter [20+10]

Tuesday 14 May 2024 09:30 (30 minutes)

We suggest a new class of models - Fermionic Portal Vector Dark Matter (FPVDM) which extends the Standard Model (SM) with $SU(2)_D$ dark gauge sector. While FPVDM does not require kinetic mixing and Higgs portal. It is based on the Vector-Like (VL) fermionic doublet which couples the dark sector with the SM sector through the Yukawa interaction. The FPVDM framework provides a vector Dark Matter (DM) with Z_2 odd parity ensuring its stability. Multiple realisations are allowed depending on the VL partner and scalar potential, which explain not only DM but also could provide solutions of various BSM hints, including $(g-2)_\mu$, flavour anomalies, W-boson mass measurement by CDF, etc.

Two examples will be discussed. One of them is the FPVDM realisation with only a VL top partner, which provides interesting and promising implications for DM direct and indirect detection experiments, relic density and collider searches. Another realisation of the FPDM framework with a doublet of new vector-like partners of muon can simultaneously explain DM relic density together with $(g-2)_\mu$ anomaly which has been in close focus of the HEP community over two decades. It predicts the mass of vector DM to be below GeV as well as the mass of the muon partner to be below 1 TeV, and provides novel multi-lepton signatures at the LHC.

The talk is based on 2203.04681, 2204.03510 arXiv papers as well as the new one which is coming this March-April.

Presenter: Prof. BELYAEV, Alexander (University of Southampton & Rutherford Appleton Laboratory)

Session Classification: Unexplored signatures & wildcard ideas