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A vector-like top quark portal to a minimal non-Abelian vector dark matter

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We suggest a new class of models "a Fermionic Portal Vector Dark Matter" (FPVDM) which extends the Standard Model (SM) with a minimal non-Abelian $SU(2)_D$ dark gauge sector. Since the mixing between the SM and dark scalars is negligibly small, the main connection between two sectors is established on the mixing between a Vector-Like (VL) fermionic doublet of $SU(2)_D$ dark group and their SM partners through the Yukawa interaction related the dark scalar. The stability of the Vector Dark Matter (VDM) from $SU(2)_D$ dark group is ensured by the conservation of the dark charge. Multiple realisations are allowed depending on the VL partner and scalar potential. In this talk, we discuss an example of minimal FPVDM realisations with merely a VL-top partner. The kinetic mixing between Z and V bosons and the multipole moment from fermionic triangle diagrams at one loop play a vital role in the direct detection constraint which excludes a large region in parameter space. However, they only have a mild effect on the DM relic abundance, indirect detection and collider constraints. We present the multiple projections of viable parameter space that survive from the DM direct and indirect detection, relic density and collider searches.

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