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Reinterpretation an ATLAS search into Dark Minimal Flavour Violation models

The existence of a new type of non-baryonic matter in the Universe, also called Dark Matter (DM), is supported by compelling astrophysical and cosmological evidence. Considerations on its measured relic density favour the hypothesis that Dark Matter is composed primarily of Weakly Interacting Massive Particles (WIMPs). Unfortunately, numerous experiments targeting the detection of these DM particles have not found any evidence of their existence. A possible solution to this tension is provided by flavoured DM models proposing a non-trivial flavour structure in the Dark Sector. Amongst all of them, particularly interesting are theories proposing top-flavoured dark matter and flavour violating couplings between the dark sector and the SM. In these Dark Minimal Flavour Violation models, several constraints on WIMPs from direct and LHC experiments are lifted at the same time that new signatures are proposed to look for Dark matter at LHC experiments. These signatures include final states with large missing transverse momentum, a top-quark and an additional quark (q) with different flavour, such as charm, bottom or lighter quarks. This contribution presents a reinterpretation of a recent published ATLAS search looking for signs of the pair production of two top-spartners in a final state with tops, charm and large missing transverse momentum in the context of these DMFV models. First limits using the ATLAS software are derived on four benchmark scenarios of these models. These results are derived using 139 fb-1 of Run-2 LHC collision data registered by the ATLAS detector.

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