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Features of Multipartite Dark Matter models

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Multipartite dark matter (DM) frameworks offer interesting phenomenology like co-annihilation, semi-annihilations, DM conversions etc to address correct relic density but avoid stringent direct search limits. We explore possible signatures of multiparticle DMs at collider via distorted missing energy, missing transverse momentum, missing mass distributions in leptonic signals and discuss conditions where such distortions can be statistically significant to infer the presence of multipartite DM framework. We also discuss advantage of an electron positron machine over the on-going LHC in doing so, where beam polarisation play a crucial role. We also touch upon possibilities with mono-X signal, where such distinctions are harder, but possible.

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