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Gamma ray tests of Minimal Dark Matter

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We reconsider the model of Minimal Dark Matter (a fermionic, hypercharge-less quintuplet of the EW interactions) and precisely compute its gamma ray signals. We compare them with a number of gamma-ray probes: the galactic halo diffuse measurements, the galactic center line searches and recent dwarf galaxies observations. We find that the original minimal model, whose mass is fixed at 9.4 TeV by the relic abundance requirement, is particularly constrained by the line searches: it is ruled out if the Milky Way possesses a cuspy profile such as NFW but it is still allowed if it has a cored one. Searches of gamma-ray lines from dwarf spheroidal galaxies are also particularly relevant, and ongoing astrophysical progresses have the potential to eventually rule out the model. We also explore a wider mass range. Furthermore, most of our results can be safely extended to the larger class of multi-TeV WIMP DM annihilating into massive gauge bosons.

Primary author: Dr PANCI, Paolo (Institut d'Astrophysique de Paris (IAP))

Co-authors: Dr SALA, Filippo (IPhT, CEA/Saclay); Dr THOMAS, Hambye (ULB, Service de Physique Thèorique); Dr CIRELLI, Marco (CEA/Saclay); Dr TAOSO, Marco (CEA/Saclay)

Presenter: Dr PANCI, Paolo (Institut d'Astrophysique de Paris (IAP))

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