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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 compute its gamma ray signatures. 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 constrained by the line searches from the Galactic Center: 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. Observations of dwarf spheroidal galaxies are also relevant (in particular searches for lines), and ongoing astrophysical progresses on these systems have the potential to eventually rule out the model. We also explore a wider mass range, which applies to the case in which the relic abundance requirement is relaxed. Most of our results can be safely extended to the larger class of multi-TeV WIMP DM annihilating into massive gauge bosons.

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