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Non-Abelian Discrete Dark Matter

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We consider the minimal model in which dark matter is stabilized by a non-Abelian discrete symmetry. The symmetry group is taken to be D_3, which is the smallest non-Abelian finite group. The minimal model contains (nontrivial) singlet and doublet scalar representations of D_3 which couple to the Standard Model fields via the Higgs portal. This construction predicts two species of dark matter over much of the parameter space. Nontrival interactions under D_3 lead to a novel thermal history of dark matter, while the multi-component nature of dark matter can be tested by future direct detection experiments.

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