

Motivations for a New Force in the Dark Sector

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A new force in the dark sector, with GeV-scale force carriers, can change the expected properties of SUSY WIMP dark matter in significant ways. The annihilation cross section at low velocities is boosted by a Sommerfeld enhancement, perhaps by 2 or 3 orders of magnitude; the WIMP annihilates to the new force carrier, which immediately decays to light particles, bypassing constraints from antiprotons and pi-0 gammas; and excited states for the WIMP are naturally generated, making inelastic scattering possible. These are exactly the properties needed to explain recent results from cosmic ray measurements and the DAMA direct detection experiment, without violating the many tight constraints from other experiments. I will review the current status of the data, show how it can be explained with such a WIMP, and discuss the signals expected in future data sets.

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