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Self-interacting dark matter in a non-abelian hidden sector

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N-body simulations of collisionless cold dark matter seem to disagree with observations on small scales, suggesting that the properties of dark matter are much richer than the conventional picture. A promising solution is self-interacting dark matter with a cross section over mass of 0.1 to 1 cmˆ2/g, which is able to bring simulations in line with observations over a wide range of astrophysical scales and not ruin large-scale structure. Motivated by these results, we construct a particle model of dark matter that has the cross sections needed to explain structure while still yielding the measured cold dark matter relic abundance. We consider dark matter charged under a hidden SU(N) gauge and work in the context of anomaly-mediated supersymmetry breaking to automatically set the correct abundance. Confinement occurs prior to structure formation, and the resulting composite particles strongly interact to yield large scattering cross sections. We discuss the difficulties of a secluded hidden sector and options for communication with the Standard Model.

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