

Milli-Magnetic Monopole Dark Matter and the Survival of Galactic Magnetic Fields

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Dark sectors with Abelian gauge symmetries can interact with ordinary matter via kinetic mixing. In such scenarios, magnetic monopoles of a broken dark $U(1)$ will appear in our sector as confined milli-magnetically charged objects under ordinary electromagnetism. If these states contribute sizably to the local dark matter density, they extract significant energy from the galactic magnetic field. We revise and extend this “Parker Bound” on galactic magnetic energy loss to milli-magnetic monopoles which leads to the strongest existing constraints on these states, over a wide range of magnetic monopole masses

Primary author: GRAESSER, Michael

Presenter: GRAESSER, Michael

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