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Dynamics of millicharged dark matter in supernova remnants

Thursday 26 March 2020 18:30 (15 minutes)

Millicharged dark matter (mDM) would form a plasma and interact with the interstellar medium and electromagnetic fields within galaxies. In this presentation, I will show a microphysical model where mDM is shocked by a supernova remnant and isotropized in the frame of the expanding fluid. We find that for $|q_\chi/m_\chi| > 10^{-13} e/\mathrm{MeV}$, the isotropization length for electromagnetic plasma instabilities is much shorter than the size of the supernova remnant. This is a necessary, though not sufficient, first step for formation of a Fermi-accelerated dark cosmic ray. I will discuss additional implications of mDM interactions in supernova remnants.

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