

Abstract Submitted
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Towards Closing the Window on Strongly Interacting Dark Matter: Far-Reaching Constraints from Earth's Heat Flow GREGORY MACK, CCAPP, Ohio Wesleyan University, JOHN BEACOM, CCAPP, The Ohio State University, GIANFRANCO BERTONE, Institute d'Astrophysique de Paris, France — We point out a new and largely model-independent constraint on the dark matter scattering cross section with nucleons, applying when this quantity is larger than for typical weakly interacting dark matter candidates. When the dark matter capture rate in Earth is efficient, the rate of energy deposition by dark matter self-annihilation products would grossly exceed the measured heat flow of Earth. This improves the spin-independent cross section constraints by many orders of magnitude, and closes the window between astrophysical constraints (at very large cross sections) and underground detector constraints (at small cross sections). In the applicable mass range, from about 1 to about 10^{10} GeV, the scattering cross section of dark matter with nucleons is then bounded from above by the latter constraints, and hence must be truly weak, as usually assumed.

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