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(I) Asymmetric Dark Matter in Main Sequence Stars

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A worldwide search is underway for elastic scattering between massive dark matter and nuclei in underground laboratories. Asymmetric dark matter particles with masses above a few GeV could easily be captured in stars via the same process. It has long been known that this can lead to observational consequences, as the weakly-interacting particles act as an efficient heat conductor. This can affect neutrino fluxes, astero/helioseismology, and even change the main sequence lifetime of stars. Modelling this process is not straightforward, and typically makes use of approximations at the limit of their validity. I will present recent results based on the first full set of Monte-Carlo simulations of this process since the 1980s, and compare the standard analytic predictions with these more accurate numerical results in order to tease out what we know and don't know about dark matter heat conduction in stars.

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