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Simulating Asymmetric Dark Matter in Stars

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Asymmetric Dark Matter (ADM) could be trapped in the sun and other stars. In the past, two heat transport formalisms were developed to explain how this ADM could alter temperature gradients in stars, which could in turn alter key components such as neutrino flux, astero-seismological signatures, and so on. More recent articles have developed a recalibrated form of the transport formalism from Spergel & Press that would also allow the ADM cross sections to be momentum or velocity dependent. This new formalism has been tested for short "snapshots" of a star, but not in full stellar evolution simulations. My summer project is to implement this in a Fortran-based simulation code that can utilize these new formalisms to model theoretical effects of dark matter in stars that can later be compared to real life asteroseismology data.

Author: MAST, Madelynn (Queen's University)

Presenter: MAST, Madelynn (Queen's University)

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