Astrophysics Seminar

Sterile neutrino dark matter and core-collapse supernovae

Tuesday

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12:30 P.M.

Rm 184 NSH

MacKenzie Warren

Physics Graduate Student,
University of Notre Dame

The nature of dark matter and the explosion mechanism of core-collapse supernovae remain two of the biggest open questions in astrophysics. A heavy sterile neutrino species may provide a solution to both of these problems. Recent observations of galaxies and galaxy clusters indicate that dark matter may be a ~keV mass sterile neutrino. In core-collapse supernovae, sterile neutrinos can efficiently transport energy from the protoneutron star core to the stalled shock via oscillations between electron neutrinos and sterile neutrinos. We have performed self-consistent simulations of core-collapse supernovae including a sterile neutrino with mass and mixing angle of a dark matter candidate. We have found that some choices of mass and mixing angle result in enhanced neutrino reheating and result in successful explosions, even in models that would not otherwise explode.

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