

# Center For Neutrino Physics Seminar

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## **New Approaches to Dark Matter**

Wednesday, November 16th, 2016

4:00 PM - 5:00 PM

304 Robeson Hall

In this talk I will discuss a novel theory of superfluid dark matter. The scenario matches the predictions of the Lambda-Cold-Dark-Matter (LambdaCDM) model on cosmological scales while simultaneously reproducing the MODified Newtonian Dynamics (MOND) empirical success on galactic scales. The dark matter and MOND components have a common origin, as different phases of a single underlying substance. This is achieved through the rich and well-studied physics of superfluidity. The framework naturally distinguishes between galaxies (where MOND is successful) and galaxy clusters (where MOND is not): due to the higher velocity dispersion in clusters, and correspondingly higher temperature, the dark matter in clusters is either in a mixture of superfluid and normal phases, or fully in the normal phase. The model makes various observational predictions that distinguishes it from both LambdaCDM and standard MOND. In the last part of the talk, I will discuss an on-going attempt at explaining cosmic acceleration as yet another manifestation of dark matter superfluidity.