Physics Colloquium

Wednesday

Oct 10

4:00 P.M.

Rm 118 NSH

Dark Matter: Very light particles have the right properties to explain small scale structure

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The nature of the primary constituent of cosmological dark matter remains unknown. The Cold Dark Matter ("CDM") paradigm fits all high redshift and all large- scale observations with accuracy, but on scales of several kpc or less the CDM model runs into difficulties, and direct detection of CDM particles has been without success. However, if the dark matter is comprised of ultra-light bosons with mass of roughly 10-22 eV and de-Broglie wavelength typically of order 1kpc, all large-scale phenomena are the same as with CDM but small-scale problems are alleviated in this model which is sometimes called Fuzzy Dark Matter ("FDM"). Low mass halos and galaxies are less abundant, alleviating the "two big to fail" galaxy problem and the absence of dark matter cusps is understood as well as other dynamical issues in low mass systems. Tests based on the Lyman-α forest and delayed high redshift galaxy formation will provide critical means to evaluate the FDM paradigm.

Part of the College of Science John A. Lynch Lecture Series

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