

Department of Theoretical Physics

Free Meson Seminar

Speaker : Surjeet Rajendran
(Johns Hopkins University)

Topic : Luminous Dark Matter

Day, Date & Time : Thursday, January 20, 2011
at 2:30 p.m.

Place : AG 69

Abstract

We propose a dark matter model in which the signal in direct detection experiments arises from electromagnetic, not nuclear, energy deposition. This can provide a novel explanation for DAMA while avoiding many direct detection constraints. The dark matter state is taken nearly degenerate with another state. These states are naturally connected by a dipole moment operator, which can give both the dominant scattering and decay modes between the two states. The signal at DAMA then arises from dark matter scattering in the Earth into the excited state and decaying back to the ground state through emission of a single photon in the detector. This model has unique signatures in direct detection experiments. The density and chemical composition of the detector is irrelevant, only the total volume affects the event rate. In addition, the spectrum is a monoenergetic line, which can fit the DAMA signal well. This model is readily testable at experiments such as CDMS and XENON100 if they analyze their low-energy, electronic recoil events.

(Nilmani Mathur)