

# Department of Theoretical Physics

## Free Meson Seminar

<i>Speaker</i>	:	Suchita Kulkarni (Bonn University, Germany)
<i>Topic</i>	:	Investigating abundances of semirelativistic particles
<i>Day, Date &amp; Time</i>	:	Thursday, November 20, 2008 at 2:30 p.m.
<i>Place</i>	:	AG 69

### *Abstract*

The analytical solution of the Boltzmann equation for the relativistic and non-relativistic regime is known. However, there is no general solution for the treatment of semi-relativistic candidates. We propose a new ansatz for thermally averaging the cross section for these particles and derive semi-analytic results for calculating their relic density. The approximate relic density of massive hypothetical particles annihilating either via S or P wave cross sections is found to be in good agreement with exact calculations. Majorana and Dirac type neutrinos have been considered as dark matter candidates for a long time. Such particles are among the examples where our formalism is applicable. In the current work the possibilities of having them as a dark matter candidate in semi-relativistic regime with abundance compatible with current bounds, or as a source of entropy production, have been considered.

*(Saumen Datta)*