

# Indirect Searches for Dark Matter Signatures at INO

*Wednesday, September 14, 2016 5:45 PM (15 minutes)*

Weakly Interactive Massive Particles (WIMPs) are among the most favored Dark Matter candidates. As the Solar System moves through Dark Matter halo, the WIMPs may scatter on the nuclei in the Sun/Earth, lose energy, and get trapped by their gravitational potentials. Their capture and subsequent annihilations in the core of Sun/ Earth may subsequently give rise to neutrinos, through various annihilation channels.

We look at the possibility of detection of such neutrinos at INO (India-Based Neutrino Observatory), which will house a 50-kt Iron Calorimeter (ICAL) detector. Detection of these neutrinos and studying their properties would help us to reconstruct nature of light Dark Matter.

In the present analysis, we give an estimate of the muon events at the detector due to WIMP annihilations in the Sun; 10 years of ICAL running. For our work, WIMP masses upto 100 GeV have been considered.

The atmospheric neutrinos in GeV range will pose background to the signal neutrinos. However, exploiting the excellent angular resolution of the ICAL detector, the background can be suppressed considerably. We also perform a  $\chi^2$  analysis to obtain limits on WIMP-nucleon cross sections.

## Summary

We look for WIMP Dark Matter annihilation in the Sun and its subsequent signatures at ICAL detector in the form of neutrinos. We try to estimate such signal events above the atmospheric background and use it to put limits on the WIMP-nucleon cross-sections.

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