

Search for the light WIMP captured in the Sun using contained events in Super-Kamiokande

Thursday, September 12, 2013 3:00 PM (20 minutes)

Super-Kamiokande can search for the dark matter by detecting neutrinos and muons which are produced by WIMP pair annihilations occur inside the Sun. Huge gravity and hydrogen rich composition of the Sun combined with high sensitivity of Super-Kamiokande for low energy (few GeV) neutrinos allow us to reach good sensitivity to light (few GeV to few 10 GeV) WIMP dark matter, especially for spin-dependent coupling case. In this analysis, we increased signal acceptance by using fully-contained and partially-contained neutrino events adding to up-going muons. Also we used minimum χ^2 method to find the allowed contribution of WIMP-induced neutrino events added to large background of atmospheric neutrino events. For that, we fitted data using energy and direction informations up to recent data of Super-Kamiokande IV. We found no signal observed and the null result is interpreted as upper limit on the spin-dependent WIMP-proton elastic scattering cross section for $\chi\chi \rightarrow b\bar{b}$ and $\chi\chi \rightarrow \tau\tau$ WIMP annihilation channels. Our result shows current best limit for WIMP mass below 100 GeV among current WIMP direct detections & indirect detections using neutrino flux.

Primary author: CHOI, Koun (Nagoya University)

Presenter: CHOI, Koun (Nagoya University)

Session Classification: Dark Matter VII

Track Classification: Dark Matter