Contribution ID: **14** Type: **Talk**

Solar neutrino detection in a large volume double-phase liquid argon experiment

Friday 18 March 2016 11:00 (20 minutes)

Two-phase liquid argon time projection chambers (LAr TPCs) are prime candidates for the ambitious program to explore the nature of dark matter. The large target, high scintillation light yield and good spatial resolution in all three cartesian directions concurrently allows also a high precision measurement of solar neutrino fluxes via elastic scattering. We studied the cosmogenic and radiogenic backgrounds affecting solar neutrino detection in a 300 tonne (100 tonne fiducial) LAr TPC operating at LNGS depth (3,800 meters of water equivalent). Such a detector could measure the CNO neutrino rate with 5 sigma sensitivity, and significantly improve the precision of the 7Be and pep neutrino rates compared to the currently available results from the Borexino organic liquid scintillator detector.

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Session Classification: Talks

Track Classification: Neutrino Physics