



Contribution ID: 94

Type: **not specified**

Search for low-mass WIMPs with the DarkSide-50 experiment

Wednesday 10 April 2019 11:15 (15 minutes)

The DarkSide-50 experiment at the LNGS underground laboratory is using a dual-phase liquid argon TPC to search for particle dark matter. A recent analysis, based on the use of only the ionization signal from very low energy events, shows the potential of liquid argon to detect low-mass WIMPs ($<10 \text{ GeV}/c^2$). The null result of this search is currently the world-leading exclusion limit on WIMP-nucleon cross sections for WIMPs with mass between 2 and 6 GeV/c^2 . In this region, noble liquids experiments were expected to have only limited sensitivity due to the vanishing scintillation signal. I will discuss the details of this analysis and briefly address the requirements for a future improvement.

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Session Classification: Parallel stream 4