

Direct search for low mass dark matter with DarkSide-50

The nature of dark matter is a fundamental problem in such fields as elementary particle physics, astrophysics and cosmology. There are lots of experiments aimed at the detection of dark matter. Among them, there is DarkSide-50 at Laboratori Nazionali del Gran Sasso (LNGS), Italy, which uses argon as the target material and measures the recoil energy of target particles, nuclei and electrons, in forms of scintillation and ionization signals. In this talk, we present the current results of several dark matter detection approaches in the DarkSide-50 experiment in the low (less than a few GeV/c^2) mass region. These results include the most stringent upper limit on the spin-independent dark matter nucleon cross section for masses between $40 \text{ MeV}/c^2$ and $3.6 \text{ GeV}/c^2$, which was obtained by using the ionization signal only and by including the Migdal effect in the analysis.

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