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Recent searches for light dark matter with DarkSide-50

Tuesday 22 August 2023 08:30 (20 minutes)

DarkSide-50 is an experiment for direct dark matter detection at Laboratori Nazionali del Gran Sasso. It uses a dual-phase time projection chamber filled with low-radioactivity argon extracted from underground. Thanks to single electron sensitivity and with an analysis based on the sole ionization signal, DarkSide-50 set the most stringent exclusion limit on WIMPs with a mass of few GeV/c^2 . A recent analysis improves by 10 times the existing exclusion limits for spin-independent WIMP-nucleon interactions in the $[1.2, 3.6] \text{ GeV}/c^2$ mass range. Thanks to the inclusion of the Migdal effect, the exclusion limits are extended down to $40 \text{ MeV}/c^2$ dark matter mass. Furthermore, new constraints are set to the interactions of dark matter particles with electron final state, namely low-mass WIMPs interacting with electrons, galactic axions, dark photons, and sterile neutrinos.

Collaboration / Activity

DarkSide-50

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