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The DarkSide experiment - present status and future

Thursday, 13 October 2016 11:00 (30)

The main purpose of the DarkSide project carried out at the Gran Sasso underground laboratory in Italy is direct detection of Dark Matter particles (WIMPs). The Dark Matter search program is based on Time Projection Chambers filled with liquid Argon. The DarkSide-50 TPC, with 50 kg of active mass, is installed inside active neutron and muon detectors. DarkSide-50 has been taking data since 2013 with Atmospheric Argon (AAr) and since April 2015 with Underground Argon (UAr), depleted in 39Ar by a factor of about 1400. The run with AAr has demonstrated the ability of the detector for three years operation in a background free condition. The result obtained with UAr has shown no candidate for Dark Matter events, thus we were able to set the best limit for Spin-Independent elastic nuclear scattering of WIMPs for Argon-based detectors, corresponding to a cross-section of about 2x10−44 cm2 at a WIMP mass of 100 GeV. The detector design, its performance and the physics results will be discussed. The future of the DarkSide experiment will be introduced.

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