

DarkSide-50: a two-phase argon TPC for a direct WIMP search

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DarkSide-50 is a two phase argon TPC for direct dark matter detection, which is installed at the Gran Sasso underground laboratory, Italy. DarkSide-50 has a 50 kg active volume and will make use of underground argon low in Ar-39. The TPC is installed inside an active neutron veto made with boron-loaded high radiopurity liquid scintillator. The neutron veto is installed inside a 1000 m³ water Cherenkov muon veto. The DarkSide-50 TPC and cryostat are assembled in two radon-free clean rooms to reduce radioactive contaminants. The overall design aims for a background free exposure after selection cuts are applied. The expected sensitivity for WIMP-nucleon cross section is of the order of 10^{-45} cm² for WIMP masses around 100 GeV/c². The commissioning and performance of the detector will be described. Details of the low-radioactivity underground argon and other unique features of the projects will be reported.

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