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The search for Dark Matter: the DarkSide-20k Experiment

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Elementary particle physics offers an attractive solution to explain non-baryonic dark matter in the form of relic Weakly Interacting Massive Particles (WIMPs). In our galaxy, dark matter might constitute a halo, extending far beyond the visible disk, whose properties are inferred e.g. from the rotational kinematics of the visible matter. WIMPs could be directly detected, as the Earth passes through such a halo, by looking at the nuclear recoils produced by WIMP interactions with ordinary matter. In this scenario, dual-phase noble liquid Time Projection Chambers (TPCs) offer competitive ways to search for dark matter directly, via elastic scattering on target detector nuclei and electrons. The Global Argon Dark Matter Collaboration (GADMC) is pursuing a multi-staged experimental program aiming to improve the detector sensitivity down to the so-called “neutrino fog”. Currently, GADMC is preparing for the DarkSide-20k experiment which features a 50 tonne underground argon dual-phase TPC with cryogenic Silicon Photomultiplier readouts. An exposure goal of 200 tonne-years with near-zero instrumental background has been set for sensitivity to a WIMP-nucleon scattering cross section of 10^{-47} cm^2 for a WIMP mass of $1 \text{ TeV}/c^2$ over a 10-year run. In this contribution the DarkSide-20k experimental program and its recent progress will be presented.

Is this abstract from experiment?

Yes

Name of experiment and experimental site

DarkSide-20k at Laboratori Nazionali del Gran Sasso (INFN - LNGS), Assergi, Italy

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

Maybe

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