

THE DARKSIDE EXPERIMENT

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DarkSide-20k (DS-20k) is a direct dark matter search using a 2-phase liquid argon time projection chamber (TPC). Like its predecessor DS-50 which has demonstrated extraordinary background discrimination, DS-20k is designed for ultra-low background. It will employ 20 tonnes of underground argon (UAr), depleted in ^{39}Ar . TPC scintillation light will be detected by SiMP arrays specially designed for cryogenic operation high quantum efficiency, and low background, and will be installed at the Gran Sasso (LNGS) underground laboratory, where it is expected to attain a background exposure resulting in a WIMP-Ar cross section of some 10^{-47} cm^2 for a WIMP masses of $1\text{TeV}/c^2$ (a factor of 10^3 better than currently published results for spin-independent cross sections for 1TeV WIMPs). DS-20k will lay the groundwork for Argo, a 200 t-fiducial mass UAr experiment designed to explore, in a background-free experiment, the parameter space for dark matter down to the “neutrino floor”. The status of the DS-20k experiment and a brief summary of present results from DS-50 will be presented.