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The DarkSide-LowMass search for dark matter below 10 GeV/cˆ2

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DarkSide-LowMass is a tonne-scale liquid argon time projection chamber (LAr TPC) being planned by the Global Argon Dark Matter Collaboration (GADMC) to search for dark matter candidates with masses below 10 GeV/cˆ2 by optimizing the TPC for an electron-counting analysis and using underground argon that has been further depleted in argon-39. The DarkSide-50 detector has previously set leading limits for dark matter candidates in this mass range, demonstrating the significant potential of this technology, due to chemical and kinematic properties of LAr. DarkSide-LowMass aims to build upon the lessons learned with DarkSide-50 to search for low-mass dark matter candidates down to the solar neutrino floor. This region is well-motivated by a growing body of theories, and the search in this region complements GADMC's efforts to reach the atmospheric neutrino floor for higher mass dark matter with the Argo experiment, being planned for SNOLAB, and they will benefit significantly from infrastructure developed by DEAP-3600 and by GADMC in preparation for the DarkSide-20k and Argo projects. DarkSide-LowMass is currently in the planning stages, with simulation and R&D activities underway to optimize the detector design, minimize backgrounds, and further reduce the energy threshold.

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