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Search for Low Mass WIMPs with liquid argon TPCs: status and perspectives CLAUDIO SAVARESE, Princeton University, DARKSIDE COLLABORATION — A body of astronomical and cosmological observations suggests the existence of Dark Matter. There is growing interest within the DM community in low-mass candidates, including light WIMPs with masses below 10 GeV/c^2, and sub-GeV/c^2 particles that interact with couplings smaller than the weak scale. Probing the parameter space for these low-mass DM candidates requires detectors with exceptionally low energy thresholds and background levels. The DarkSide collaboration demonstrated the ability of a dual-phase LAr-TPC to search for such particles by exploiting the very high electron extraction efficiency and the inherent gain of the ionization signal with the DarkSide-50 detector. A LAr-TPC specifically built to pursue lower-energy signals by focusing on the ionization channel could realistically push the experimental sensitivity to low-mass DM down to the solar neutrino floor. I will detail the experimental challenges connected to this goal and introduce the efforts that are currently being made to address these issues. Finally I will present the sensitivity projections that a future tonne-scale LAr-TPC could achieve.

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