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DM searches with LAr

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Experimenters from four different argon dark matter searches have joined their forces in the the "Global Argon Dark Matter Collaboration" to carry out a unified program for dark matter direct detection.
The next step at the scale of a few tens of tonnes is the DarkSide-20k experiment, a 20-tonne fiducial volume dual-phase TPC to be operated at LNGS with an underground argon fill, designed to collect an exposure of 100 tonne×years, completely free of neutron-induced nuclear recoil background and all electron recoil background. DarkSide-20k is set to start operating by 2023 and will have sensitivity to WIMP-nucleon spin-independent cross sections of 7.4×10−48 cm2 for WIMPs of 1 TeV/c2 mass, to be achieved during a 10 year run with an exposure of 200 tonne×years. DarkSide-20k will explore the WIMP-nucleon cross-section down to the edge of the 'neutrino floor', where coherent neutrino-nucleus scattering from environmental neutrinos induce nuclear recoils in the detector.
A second step in the program is the construction and operation of Argo, a detector with a fiducial mass of a few hundred tonnes, capable of collecting an exposure of several thousands of tonne×years, completely free of all backgrounds on top of CNNS, slated for a 2030 start.

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