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Sensitivity to core-collapse supernovae neutrino signals in DarkSide-20k

DarkSide-20k (DS-20k) will explore the dark matter WIMP hypothesis with a dual-phase time projection chamber detector filled with 50 tonnes of low-radioactivity liquid argon extracted from underground sources. Besides the primary physics goal of DS-20k, the low-energy threshold (~ 1 keV) of the detector will allow it to observe neutrinos from core-collapse supernovae (CCSN) via coherent elastic neutrino-nucleus scattering (CEvNS). In this way, DarkSide-20k will produce a flavour-blind measurement of the unoscillated neutrino flux from a CCSN providing the normalisation for current and future giant detectors which are mostly sensitive to electron (anti-)neutrinos. In addition, DS-20k will be able to join the network of the SuperNova Early Warning System 2.0 (SNEWS2.0), providing additional input for triangulating core-collapse supernovae.

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