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The DarkSide-20k experiment at LNGS

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The DarkSide program at Laboratori Nazionali del Gran Sasso (LNGS) aims to detect dark matter WIMP particles in dual phase Liquid Argon (LAr) Time Projection Chambers (TPC). Since 2015, DarkSide has run since a 50-kg-active-mass dual phase LAr TPC filled with low radioactivity argon from an underground source and produced results for both the low mass and high mass direct detection search.
The next stage of the DarkSide program will be a new generation experiment involving a global collaboration from all the current Argon based experiments. DarkSide-20k is designed as a 20-tonne fiducial mass dual phase LAr TPC with SiPM based cryogenic photosensors. Like its predecessor, DarkSide-20k will be housed at the INFN LNGS underground laboratory, and it is expected to attain a WIMP-nucleon cross section exclusion sensitivity of $7.4 \times 10^{-48}\ cm^2$ for a WIMP mass of 1 TeV/c^2 in a 200 t yr run. DarkSide-20k will be installed inside a membrane cryostat containing more than 700 ton of liquid Argon and be surrounded by an active neutron veto. The talk will give the latest updates of the ongoing construction and prototype tests validating the initial design.

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