



Contribution ID: 24

Type: **not specified**

## The search for dark matter in DarkSide

*Wednesday, 13 September 2023 15:00 (15 minutes)*

DarkSide run since mid 2015 a 50-kg-active-mass dual phase Liquid Argon Time Projection Chamber (TPC), filled with low radioactivity argon from an underground source and produced world class results for both the low mass ( $m < 20 \text{ GeV}/c^2$ ) and high mass ( $m > 100 \text{ GeV}/c^2$ ) direct detection search for dark matter.

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 Liquid Argon TPC with SiPM based cryogenic photosensors, and is expected to be free of any instrumental background for an exposure of  $>100 \text{ tonne} \times \text{year}$ . Like its predecessor, DarkSide-20k will be housed at the INFN Gran Sasso (LNGS) underground laboratory, and it is expected to attain a WIMP-nucleon cross section exclusion sensitivity of  $7.4 \times 10^{-48} \text{ cm}^2$  for a WIMP mass of  $1 \text{ GeV}/c^2$  in a  $200 \text{ t yr}$  run. DarkSide-20k will be installed inside a membrane cryostat containing more than 700 t of liquid Argon and be surrounded by an active neutron veto based on a Gd-loaded acrylic shell. The talk will give the latest updates about the ongoing prototype tests validating the design, the progress of construction and the future plans.

**Primary author:** DAVINI, Stefano (Istituto Nazionale di Fisica Nucleare)

**Co-author:** MATTEUCCI, Giuseppe (Istituto Nazionale di Fisica Nucleare)

**Presenter:** MATTEUCCI, Giuseppe (Istituto Nazionale di Fisica Nucleare)

**Session Classification:** DDM: Direct DM searches

**Track Classification:** Direct DM searches