



Contribution ID: 24

Type: **not specified**

The search for dark matter in DarkSide

Wednesday, September 13, 2023 3:00 PM (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 ($\sigma < 20 \text{ fb}/c^2$) and high mass ($\sigma > 100 \text{ fb}/c^2$) 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 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