

30th International Symposium on Lepton Photon Interactions at High Energies



Contribution ID: 126

Type: **Parallel session talk**

DarkSide-20k and the Future Liquid Argon Dark Matter Program

Tuesday, January 11, 2022 5:10 PM (20 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 ($M_{WIMP} < 20 GeV/c^2$) and high mass ($M_{WIMP} > 100 GeV/c^2$) 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 tonne x 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 $7.4 \times 10^{-48} cm^2$ 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 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 of the ongoing R&D and prototype tests validating the initial design.

A subsequent objective, towards the end of the next decade, will be the construction of the ultimate detector, ARGO, with a 300 t fiducial mass to push the sensitivity to the neutrino floor region for high mass WIMPs.

Author: GARCIA ABIA, Pablo (CIEMAT)

Presenter: TESTERA, Gemma (INFN e Universita Genova (IT))

Session Classification: Dark Matter

Track Classification: Dark Matter