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Type: Talk

## Silicon-based cryogenic Photon Detection Units testing for DarkSide-20k experiment

Wednesday, July 19, 2023 5:00 PM (20 minutes)

DarkSide-20k is the final detector of the DarkSide direct dark matter search program that involves the researchers from the global collaboration formed by all major current Argon-based experiments (GDMAC). DarkSide-20k is a 20-tonne fiducial mass dual-phase Liquid Argon Time Projection Chamber (LArTPC) filled with low radioactivity argon equipped with SiPM-based cryogenic photosensors. The experiment is expected to be free of any instrumental background for exposure of >100 tonnes per year. Like its predecessor DarkSide-50, it will be constructed in INFN Gran Sasso (LNGS) underground laboratory.

DarkSide in collaboration with FBK started a dedicated development and customization of SiPM technology suitable for the LAr application resulting in the design, production and assembly of large surface matrixes (20×20 cm<sup>2</sup>) Photo Detection Unit. PDUs will be mass-produced in the following year to integrate the two optical planes of the TPC (~21 m<sup>2</sup> total SiPM surface) and as photosensors for the veto system (~5 m<sup>2</sup>).

The main characteristics of the first PDU prototype have been studied over a long acquisition campaign in liquid nitrogen at Naples' DarkSide Laboratory (CryoLab) and will be presented in this talk. The PDU was tested for varying overvoltage values and different readout and power configurations by measuring the signal-to-noise ratio for each of them. A study of the stability of the performances has been carried out.

### Is this abstract from experiment?

Yes

### Name of experiment and experimental site

Darkside-20k

### Is the speaker for that presentation defined?

Yes

### Details

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### Internet talk

No

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