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Production of the DarkSide-20k photo detectors

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Darkside-20k is currently under construction at the Gran Sasso Laboratory (LNGS) by the Global Argon Dark Matter Collaboration. DarkSide-20k comprises a target mass of 50 tonnes of low-radioactivity underground argon (UAr) in a dual phase time projection chamber (TPC), surrounded by an instrumented inner neutron veto and outer cosmic veto. The main aim of this detector is to search for the interaction of Dark Matter particles with the UAr target, probing down to the neutrino fog.
Darkside-20k is designed to be instrumentally background free during the planned exposure of 200 t-yr. Towards this goal, the detector utilises novel technologies including underground Ar depleted in the radioactive 39Ar isotope, large-area cryogenic Silicon Photomultiplier (SiPM) array photodetectors. These bespoke SiPM structures, assembled into photo detector modules, meet the strict radiopurity, photon detection and noise requirements of DarkSide-20k, and are employed to instrument both the TPC and veto systems. In this talk the novel photon detector system status of DarkSide-20k will be described, with a focus on the ongoing production of these photo detectors in Italy and the UK including the development of QA/QC procedures to ensure optimum performance and minimise radioactivity levels

Collaboration

DarkSide-20k

Role of Submitter

I am the presenter

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