



Contribution ID: 157

Type: poster

DarkSide-20k Veto photon-detector units: construction and characterization

Tuesday, 24 September 2024 21:04 (1 minute)

DarkSide-20k, a global direct dark matter search experiment, is located at the Gran Sasso National Laboratory (LNGS), Italy. It is designed to reach a total exposure of 200 tonne-years nearly free from instrumental backgrounds. The core of the detector is a dual-phase Time Projection Chamber (TPC) containing 50 tonnes of underground liquid argon (UAr) with low levels of cosmogenic ^{39}Ar isotope. Surrounding the TPC walls is a layer of polymethylmethacrylate (PMMA), acting as a neutron veto. The neutron veto is equipped with large-area cryogenic Silicon Photomultiplier (SiPM) array detectors, positioned along the walls of the TPC on the outer side. SiPMs are arranged in a compact layout to reduce the amount of material used for the Printed Circuit Board (PCB), cables and connectors which together form the Veto PhotoDetection Units (vPDUs). A vPDU consists of SiPMs, along with front-end electronics and a motherboard, which distributes voltage and control signals and electrical signal transmission.

This talk focuses on the production of the first vPDUs, emphasising the rigorous QA/QC procedures, and the final characterisation of the first completed prototypes. Extensive testing in liquid nitrogen baths has been conducted on the vPDUs, aiming to assign a “quality passport” to ensure optimal performance and reliability in the DarkSide-20k experiment.”

Primary author: Mr AHMAD, Iftikhar (AstroCeNT)

Presenter: Mr AHMAD, Iftikhar (AstroCeNT)

Session Classification: Poster Session