

# The Data Acquisition System for the DarkSide-20k Detector

*Thursday, 11 February 2021 13:00 (15)*

The DarkSide Collaboration intends to build a new direct WIMP search detector DarkSide-20k (DS-20k), a dual-phase Liquid Argon Time Projection Chamber (LAr TPC) with an active mass of 23 t. Located at the Gran Sasso Laboratory in Italy, the DS-20k LAr TPC will be enclosed inside a liquid scintillator neutron veto and submerged inside an external liquid scintillator bath which will act as a cosmogenic veto. The experiment is designed to be “background-free”, achieved with the use of low-radioactivity underground argon, Pulse-Shape Discrimination (PSD) and the veto systems. The DS-20k experimental design boasts a projected sensitivity to the spin-independent WIMP-nucleon cross section of  $1.2 \times 10^{-47}$  cm<sup>2</sup> for a 1 TeV/c<sup>2</sup> WIMP mass, assuming a 100 tonne-year exposure (5-year run) in the absence of any backgrounds inside the WIMP search region.

Scintillation photons generated inside the TPC and veto will be measured with the use of Silicon Photomultipliers (SiPMs). DarkSide-20k will use 50 x 50 mm<sup>2</sup> Photodetector Modules (PDMs), comprised of a large tile of SiPMs that will act as a single photodetector. There are approximately 5000/3500 PDMs envisioned for the TPC/veto systems. To readout such a vast number of PDMs poses various logistical challenges for the data acquisition (DAQ) system. This talk will outline the proposed DAQ system/readout strategy for the DS-20k detector and discuss the challenges associated with such a system, with a particular focus on the neutron veto.

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## Please select: Experiment or Theory

Experiment

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