

The DarkSide Proto-0 Experiment in Napoli

DarkSide-20k is an experiment aimed at the direct search for WIMP dark matter, currently under construction at LNGS. It employs a 50-ton (20-ton fiducial) two-phase argon time projection chamber (TPC). Among the many innovations of the DS-20k TPC is the use of newly developed, radiopure SiPM-based photon counters, produced in a dedicated facility at LNGS, NOA, and tested in the Cryogenic Laboratory at INFN Napoli. DarkSide-Proto0 (Proto0) is its official prototype, focusing on the geometrical optimization of the ionization signal (S2) production in two-phase argon TPCs and validating many of the novel technologies featured in the DS-20k detector on a smaller scale. The main feature of the Proto0 detector is its flexible TPC design, with independently movable components during operation. The results obtained from Proto0's scientific program will help fine-tune the DS-20k TPC design and contribute to a broader understanding of the engineering challenges behind future two-phase experiments. The experiment is currently collecting data using a specially designed cryogenic setup, complete with argon condensation, recirculation, and purification loops.

Primary author(s) : MATTEUCCI, Giuseppe (INFN Sez. Napoli, Università degli Studi di Napoli Federico II)

Presenter(s) : MATTEUCCI, Giuseppe (INFN Sez. Napoli, Università degli Studi di Napoli Federico II)