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Cryogenic facilities at the University of Granada for neutrinos searches in LArTPCs

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Liquid Argon Time Projection Chambers (LArTPCs) have emerged as a premier, high-resolution, fully active calorimetric technology for next-generation neutrino detectors such as DUNE. Their main advantages rely on excellent 3D imaging and particle identification capabilities. This is possible thanks to the collection of both electrons and scintillation photons produced after an interaction. Detection of argon scintillation light is particularly challenging given its short wavelength (127 nm), which is inaccessible to most standard photodetectors, requiring complex wavelength-shifting materials to convert it to visible light. Additional challenges include a short attenuation length due to contaminants, Rayleigh scattering, and the need for a cryogenic environment. However, detection of scintillation light will be of central importance to fully exploit the potential of future LArTPCs. Increasing the collection of photons in a LArTPC can be achieved by developing more efficient photosensors, by reducing argon impurities that cause optical absorption, or by doping the argon with xenon. We describe in this talk the different cryogenic facilities operating at the University of Granada toward a more efficient collection of photons in LArTPCs.

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