



ID de la contribución : 1082

Tipo : Talk

Status of DarkSide-20k and the underground Ar program

miércoles, 19 de noviembre de 2025 17:15 (15)

DarkSide-20k is under construction at LNGS and is designed to lead the search for heavy WIMPs in the coming years. In addition to this, it has prospects to lead other DM searches and perform relevant detections of neutrinos from the Sun, the atmosphere, and Supernovae. Argon has the advantage of pulse shape discrimination compared to other noble elements, but has the drawback of the cosmogenically induced ^{39}Ar content with an activity of 0.96 Bq/kg. Getting rid of this background is pivotal for the success of our scientific program. For this reason, the experiment will use underground Argon, in which the concentration of ^{39}Ar is depleted by at least a factor of 1400. The extraction of the needed 120 tonnes will take place at the Urania plant in Colorado, the purification at the ARIA plant in Sardinia, and the characterization at the DArT experiment in Canfranc. In this talk, I will present the sensitivity of the DarkSide-20k to different rare events and the status of the overall program, with a focus on the Spanish contributions.

Abstract

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Clasificación de la sesión : RENATA (Red Nacional Temática de Astropartículas)

Clasificación de temáticas : Red Temática de Astropartículas (RENATA)