ID de la contribución : **1015** Tipo : **Talk**

The COLINA experiment: a conical TPC for CEvNS detection.

miércoles, 19 de noviembre de 2025 16:00 (15)

The COLINA project aims to develop an innovative single-phase noble liquid time projection chamber (TPC) to detect CEvNS. Two distinct ideas are combined to maximize the potential of the technique. 1) The signal will be amplified through electroluminiscence (EL). 2) The TPC will be shaped as a conical frustum.
Single-phase EL is unaffected by charge trapping which is a major deterrent of dual-phase noble liquid TPCs for CEvNS searches at shallow depths. However, it requires extremely high electric fields. Such fields can be reached by using very thin wires – μm-scale diameter. This is an impediment to produce large amplification regions. Common TPC shapes are thus limited in size and target mass. The conical shape allows to maximize the mass by drifting all charges towards a small amplification region at the smaller circle of the cone. Such scheme appears as cost-efficient as it allows for good coverage with few sensors.
The final goal is to deploy COLINA, a conical TPC capable of holding ~50 kg of LXe, at the largest spallation neutrino source, the European Spallation Source. Simulations point to a conservative energy threshold as low as ~0.5 keVnr. The detector will allow for operation with different noble gases. The increase in density of liquid-phase, compared to gaseous-phase, results in large CEvNS interaction rate with rather small detectors. In fact, COLINA will produce the larger CEvNS statistics in all the considered isotopes, Xe, Kr and Ar, and will do so in unexplored energy regions for the process, where the physics relevance is maximal.
The project was recently funded and is now starting its active development and prototyping. In this talk I'll give a brief overview of the project highlighting the expected performance and the various challenges that are expected to be tackled during the coming years.

Abstract

Primary author(s) : SIMÓN ESTÉVEZ, Ander (IFIC)

Presenter(s) : SIMÓN ESTÉVEZ, Ander (IFIC)

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

Clasificación de temáticas : Red Temática de Astropartículas (RENATA)