



Contribution ID: 42

Type: **Talk**

Challenges and improvements of the TREX-DM, low-mass WIMP search

Friday, 20 September 2024 11:10 (20 minutes)

The race for the discovery of the Dark Matter is as lively as ever; the axion and the WIMP are the two main particle candidates that could solve the mystery. The absence of signal in the typical mass window for the WIMP, of the order of 100 GeV, has pushed the search to lower masses. The TREX-DM experiment is looking for low-mass WIMPs of the scale of 1-10 GeV/c²: it is a high-pressure gas Time Projection Chamber, equipped with Micromegas detectors, and is located at the Canfranc Underground Laboratory (LSC, 2500 m.w.e.). The requirements for TREX-DM to be competitive are very low background level (order 1-10 c/keV/day/kg) and low energy threshold (below 1keVee). TREX-DM carries the advantage of being able to change the gas and the pressure in order to optimise energy transfer and detector performance. We will comment on the current performance (background of the order 100 c/keV/day/kg) and the strategies followed to improve it. Emphasis will be given to three parts: surface contamination measurements and mitigation and the new, high-sensitivity detector developed for that purpose, with the aim to reduce the current background levels by a factor 10 (or 100); gain improvements with the use of a preamplification stage, that would lower the threshold at least a factor 10; and low energy volume calibrations, necessary to assess this performance.

Primary author: Dr DAFNI, Theopisti (CAPA/Universidad de Zaragoza)

Presenter: Dr DAFNI, Theopisti (CAPA/Universidad de Zaragoza)

Session Classification: Morning 5