Contribution ID: **136** Type: **Oral**

An LNGS Mobile Neutron Detector (ALMOND): Mapping Ambient Neutron Background of Gran Sasso National Laboratory

Monday 25 August 2025 17:00 (20 minutes)

In deep underground laboratories, environmental neutrons, which are produced at the cavern walls, introduce a source of background to rare event searches, such as dark matter direct detection and neutrinoless double beta decay experiments as well as low-cross section measurements for nuclear astrophysics. The flux and spectrum of the ambient neutrons vary greatly with time and location. Precise knowledge of this background is necessary to devise shielding and veto mechanisms, improving the sensitivity of the neutron-susceptible underground experiments.

ALMOND, currently in operation, is a low-flux neutron spectrometer developed for the LNGS underground laboratory to measure the ambient neutron background of the entire facility. In this talk, an overview of the design, construction and calibration of ALMOND will be presented. Furthermore, the results of the first underground measurements will be shown along with an outlook for future measurements. The project was supported by the German Federal Ministry of Education and Research (BMBF) under the grant number 05A21VK1.

Collaboration you are representing

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Session Classification: Underground Laboratories

Track Classification: Underground Laboratories