Contribution ID: **34** Type: **not specified**

Environmental neutron measurement at the Gran Sasso laboratory in the NEWSdm experiment

Thursday 14 December 2023 12:00 (30 minutes)

The NEWSdm experiment is designed to search for dark matter with directional sensitivity at the Gran Sasso laboratory. Nano Imaging Tracker (NIT) used in the NEWSdm experiment is a super-high resolution nuclear emulsion detector. This extremely high spatial resolution makes NIT the unique solid tracking detector capable of determining the direction of nuclei with a track length of 100 nm, equivalent to several tens of keV in energy. In parallel with the dark matter search, we are progressing neutron measurements targeting hydrogen in NIT itself. An automatic readout system has been well established that is capable of acquiring 3-dimensional vector for recoil protons above 100 keV. Neutron spectra measurements including sub-MeV region have been performed at the Gran Sasso laboratory, and we will report on the status of these measurements.

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