

Directional dark matter searches with the NEWSdm Experiment

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The nature of dark matter is one of the most relevant open problems both in cosmology and particle physics. Many different experimental techniques have been designed and built to detect Weakly Interactive Massive Particles (WIMPs) as dark matter candidates via their scattering with detector atoms. The NEWSdm experiment, located in the Gran Sasso underground laboratory in Italy, is based on a novel nuclear emulsion technology with nanometric resolution and new emulsion scanning microscopy that can detect recoil track lengths down to one hundred nanometers. Therefore, it is the most promising technique with nanometric resolution to disentangle the dark matter signal from the neutrino background, with a directional approach meant to overcome the background from neutrinos. The experiment has carried out measurements of neutrons and a run with equatorial telescope is in progress. In this talk we discuss the status of the experiment and we report the first analysis of data taken at Gran Sasso. We also discuss its sensitivity to boosted dark matter, achievable with a 10 kg emulsion module, exposed for one year at the Gran Sasso surface laboratory.

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