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Status of the TREX-DM experiment at the Canfranc Underground Laboratory

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TREX-DM (TPC Rare Event eXperiment for Dark Matter) is an approved experiment by the Canfranc Underground Laboratory (LSC) in Spain, intended to look specifically for low-mass WIMPs (<10 GeV) that could be pervading the galactic dark halo. This requires the use of light elements as target and detectors with very low energy threshold; TREX-DM is conceived to fulfil these requirements using a gas time projection chamber (TPC) equipped with novel micromesh gas structures (Micromegas) readout planes. The detector can hold, in the fiducial volume, ~ 20 litres of pressurized gas up to 10 bar, which corresponds to ~ 300 g of Ar, or alternatively, ~ 160 g of Ne. The Micromegas are highly segmented and read with a self-triggered acquisition, allowing for effective thresholds below 0.4 keV (electron equivalent). An exhaustive material screening campaign has allowed to design and construct the detector and shielding with the state-of-the art radiopurity specifications. The background model developed by Monte Carlo simulations suggests that levels of the order of 1-10 counts $\text{keV}^{-1} \text{kg}^{-1} \text{d}^{-1}$ are expected in the region of interest, making TREX-DM competitive in the search for low mass WIMPs. After completion of a series of measurements at ground level, the commissioning at the LSC facilities is almost finished and the start of the data taking is expected for this summer. Operation with Ne first and (depleted) Ar afterwards is foreseen. Here, the description of the background model, the status of the installation and first operation in Canfranc, and the expected WIMP sensitivity will be presented.

I am also submitting an abstract to the track: Direct Detection

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