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Search for low mass WIMPs with low-threshold low-background TPCs: the TREX-DM experiment

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The standard WIMP Dark Matter (DM) paradigm, based on the "WIMP miracle", is now severely constrained by the negative results from direct DM experiments and the LHC. But WIMPs of particularly low masses (below 10 GeV) would produce nuclear recoils of energies below typical experimental thresholds, and so would have evaded detection so far. This type of WIMPs are still viable in the remaining non-excluded SUSY phase space, or in non-SUSY models, like the so-called asymmetric DM. Their direct experimental detection poses very particular and demanding technological challenges that are not within reach of mainstream WIMP experiments. Therefore a novel type of WIMP experiments has been recently born focused on the low mass part of the WIMP parameter space. TREX-DM is one of such projects, based on the low-threshold and low-background offered by detection in high pressure gas and Micromegas amplification structures of the microbulk type, developed as part of the T-REX project. The experiment has recently been approved by the LSC (Laboratorio Subterráneo de Canfranc) scientific committee and its installation underground is ongoing at the moment. If the background model anticipated by an extensive material screening campaign is confirmed experimentally, TREX-DM can have very competitive prospects in the new experimental landscape of the low-mass WIMP searches. The experiment should move to commissioning phase and first data taking throughout 2018.

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