

Calibration Systems of the XENON1T Dark Matter Experiment

The XENON1T detector, currently under construction at the Gran Sasso underground laboratory, will contain 3200kg of liquid xenon. A liquid noble element detector needs to be calibrated to understand its responses to both electronic and nuclear recoils. The additional volume of XENON1T poses new opportunities and new challenges. The greater volume makes it possible to use neutron double scatters from a DD-fusion generator to achieve an in situ nuclear recoil energy calibration. However, introducing sufficient activity into the inner volume to perform electronic recoil calibrations becomes challenging due to the larger volume. Dissolved sources in the liquid xenon offer a solution to this challenge. Thorium-228, the daughters of which produce a low-energy beta spectrum of interest, has been identified as one potential dissolved source. The calibration systems of XENON1T are presented in this poster.

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