

Abstract Submitted
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Energy resolution of the XENON1T Dark Matter detector in the keV to MeV range¹ TIANYU ZHU, Columbia Univ, XENON COLLABORATION — Xenon dual-phase time projection chambers designed to search for Weakly Interacting Massive Particles (WIMPs) have been characterized by deteriorating energy resolution for electronic recoil energies above ~ 100 keV, due to their common emphasis on amplifying tiny signals for low energy threshold. In the XENON1T experiment, we have developed a signal correction method to rectify the saturation of the digitizer dynamic range and distortions due to the non-linear response of the photomultiplier tubes. Searches for signals of physics interest in the energy range from keV to MeV all benefit from this method. In particular, we demonstrate that at 2.46 MeV, the expected energy of the neutrinoless double-beta decay signal of ^{136}Xe , the relative energy resolution (at $1-\sigma$) is as low as $(0.81\pm 0.02)\%$ for single-site interactions.

¹NSF

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