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The XENON1T Excess and What XENONnT Can Say About It

EVAN SHOCKLEY, University of California, San Diego, XENON COLLABORATION — XENON1T is a dual-phase xenon time projection chamber that operated deep underground at Italy’s Gran Sasso National Laboratory from 2016 to 2018. Primarily designed to search for WIMP dark matter, XENON1T featured a ton-scale target mass, keV-scale energy threshold, and ultra low background rate that together allowed for world-leading sensitivity to a variety of rare-event processes. Interestingly, an excess of electronic recoil events was observed in XENON1T, disfavoring at $> 3\sigma$ the background-only hypothesis. The origin of the excess remains unknown; however, XENON1T’s successor, XENONnT, featuring a larger target mass and further reduced background level, is now being commissioned and will be able to probe the parameter space of interest with improved sensitivity. This talk will summarize the XENON1T result, briefly discuss possible explanations for the excess, and then detail the power of XENONnT to distinguish various hypotheses.

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