

The electronic recoil excess in XENON1T and the prospect to decipher it with XENONnT

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The XENON1T dark matter experiment, operated at the INFN Laboratori Nazionali del Gran Sasso, achieved the lowest electronic recoil background among all dark matter experiments, which is 76 ± 2 events/(t·y·keV) below 30 keV. An excess of electronic recoils was found below 7 keV and most prominent between 2 and 3 keV. The excess could be induced by solar axions, solar neutrinos with an enhanced magnetic moment, or a trace amount of tritium background which could not be confirmed nor rejected. Consistent results were obtained by using ionization signals only, an approach which is more sensitive at low energies. XENONnT, the upgraded version of XENON1T, features a factor of 3 larger active mass and a factor of 6 reduced background, and thus will be more sensitive to low-energy electronic recoils. In this talk, I will review the excess electronic recoils in XENON1T and present the prospect to decipher the origin of the excess with data from XENONnT.

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Your gender (free text)

Primary author(s) : YE, Jingqiang (Columbia University)

Presenter(s) : YE, Jingqiang (Columbia University)

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