

Measurement of the first-forbidden non-unique β -decay energy spectrum of 214-Bi to the ground state of 214-Po in XENONnT

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The XENONnT experiment, situated at the INFN Laboratori Nazionali del Gran Sasso, is a dark matter direct detection experiment with a target of 5.9 tonnes of instrumented liquid xenon. The detector aims to detect the O(10)keV signal from a dark matter particle recoil, but it also offers the possibility to measure radioactive decays at higher energies. Our study presents a method to perform a measurement of the energy spectrum of the first-forbidden non-unique beta decay of 214-Bi to the ground state of 214-Po, found in the background radiation originating from the radon decay chain. The interest in this measurement is twofold. Firstly, it provides an internal calibration sample to characterise the detector's response to beta decays. Secondly, it allows comparison of the measured energy spectrum with predictions from nuclear structure model calculations, a challenge itself for these large nuclei.

Poster prize

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