Physics Division Colloquium

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Benjamin Jones, University of Texas, Arlington

Better Neutrinoless Double Beta Decay through Biochemistry

The goal of future neutrinoless double beta decay experiments is to establish whether neutrino is its own antiparticle, by searching for an ultra-rare decay process with a half life that may be more than 10^27 years. Such a discovery would have major implications for cosmology and particle physics, but requires ton-scale or larger detectors with backgrounds below 1 counts per ton per year. This is a formidable technological challenge that has prompted consideration of unconventional solutions. I will discuss an approach being developed within the NEXT collaboration: high pressure xenon gas time projection chambers augmented with single molecule fluorescent imaging-based barium tagging. This combines techniques from the fields of biochemistry, super-resolution microscopy, organic synthesis and nuclear physics, possibly enabling the first effectively background-free, discovery-class neutrinoless double beta decay technology.

To meet with the speaker (remotely), please contact the host Corey Adams.