

# Workshop on Xenon Detector $0\nu\beta\beta$ Searches: Steps Towards the Kilotonne Scale

Contribution ID: 6

Type: **Invited talk**

## Single Molecule Fluorescence Imaging for Barium Tagging

*Thursday, 26 October 2023 13:50 (25 minutes)*

Detection of a single  $Ba^{2+}$  ion in many tons of xenon is a formidable technological challenge. The difficulty is exacerbated by the fact that  $Ba^{2+}$ , the expected final state in double beta decay of gaseous  $^{136}Xe$ , has no visible-accessible optical transitions to use for atomic fluorescence spectroscopy. To overcome this challenge, the NEXT collaboration is developing a method of tagging individual barium ions using bespoke organic molecules that undergo fluorescence enhancement when chelating barium ions. In this talk I will describe the current state of the art and ongoing R&D toward realization of this technology, which may enable very-low-background, ultra-large  $0\nu\beta\beta$  detectors.

**Primary author:** JONES, Ben (University of Texas at Arlington)

**Presenter:** JONES, Ben (University of Texas at Arlington)

**Session Classification:** Ba daughter tagging