Preliminary β-Spectrum Measurements with the β-Spectrum Module with Implications for Long-Lived Reactor $\bar{\nu}$ Calculations*

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β-spectra measurements have a long history in physics which led to discovery of the $\bar{\nu}$ and parity violating decays. Modern implications of β-spectra measurements include reactor $\bar{\nu}$ predictions, medical physics, and possible identification of exotic physics. Most β-spectra measurements are based on a few simple β decaying nuclei near stability due to the inability to isolate individual β decay components in more complex β decays. Also there are experimental difficulties due to electrons being light charged particles which interact with everything, making experimental setups challenging to design, build, and execute. A recent novel experimental technique developed at Oak Ridge National Laboratory allows isolation of individual β-energy spectra of more complex β decays using the β-Spectrum Module (βSM) integrated with the Modular Total Absorption Spectrometer (MTAS). This technique will greatly expand the number and types of studiable β spectra and the isolation of individual β-decay components to allow one-to-one isolation of emitted $\bar{\nu}$ spectra. Preliminary results from the βSM will be presented along with their impact on long-lived reactor $\bar{\nu}$ predictions [1].

[1] Double Chooz: A. Onillon, https://conferences.iaea.org/event/337/contributions/26542/

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