

Abstract Submitted
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An Improved Apparatus for $2\nu\beta\beta$ and ECEC Studies to Excited Final States SEAN FINCH, RAJARSHI RAUT, WERNER TORNOW, Duke University and TUNL — To extend our successful measurements of $T_{1/2}$ for ^{100}Mo and ^{150}Nd to the first excited 0^+ state to other nuclei of interest requires an increase in the coincidence efficiency of our two HPGe detector setup, due to low amounts of isotopically enriched target material. Such measurements provide valuable test cases for $2\nu\beta\beta$ nuclear matrix element calculations, which in turn are used to tune $0\nu\beta\beta$ nuclear matrix element calculations. Instead of the two previously used 80 mm diameter and 50 mm long crystals sandwiching the target of interest, we now use two HPGe clover detectors. Clover detectors not only provide higher coincidence efficiency for back-to-back gamma rays due to their larger volume, but also allow detection of coincidences from the $0^+ \rightarrow 2^+ \rightarrow 0^+$ decay sequence of the daughter nucleus within the four-fold segmented clover detectors themselves. We report results on our coincidence efficiency measurements for the two clover detectors in close geometry and present background spectra taken above ground at TUNL and below ground at the Kimballton Underground Research Facility (KURF). Finally, we will discuss first spectra taken with an isotopically enriched ^{96}Zr sample.

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