Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Fully characterizing a rank-0 forbidden beta decay for the reactor $\bar{\nu}_e$ energy spectrum[1] JAMES MCNEIL, TRIUMF/UBC, JOHN BEHR, ALEXANDRE GORELOV, TRIUMF, MELISSA ANHOLM, University of Manitoba, DAN MELCONIAN, Texas AM, DANNY ASHERY, University of Tel Aviv — An anomalous bump-like excess in the $5-7$ MeV range of the reactor antineutrino ($\bar{\nu}_e$) spectra continues to persist. In this energy range first-forbidden 0^- to 0^+ decays account for $\sim 30\%$ of the total $\bar{\nu}_e$ flux. The ^{92}Rb ground-state to ground-state (GS) branch alone accounts for $30-50\%$ of the total 0^- to 0^+ $\bar{\nu}_e$ flux in this energy range. Using the TRINAT neutral ^{92}Rb atom trap, all final state momenta are kinematically constrained, and the beta-neutrino angular correlation coefficient $a_{\beta\nu}$ is examined experimentally. GS decays are kinematically isolated from excited state transitions in Q-value by the total energy release. The GS beta energy dependence of $a_{\beta\nu}$ is used to test the rank-0 forbidden formalism and measure the ratio of the two nuclear elements ω/ξ_o. The ratio ω/ξ_o is extracted from the ^{92}Sr recoil ion energy spectra with sensitivity of ± 0.10 at 90% C.L. A deviation in ω/ξ_o from zero at our sensitivity limits would necessarily distort the allowed $\bar{\nu}_e$ spectrum in the $5-7$ MeV range by as much as $\pm 3\%$.

[1]NSERC, NRC through TRIUMF, U.S. D.O.E.

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Date submitted: 26 Jun 2020 Electronic form version 1.4