

Abstract Submitted
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TRIMS: Validating T_2 Molecular Effects for Neutrino Mass Experiments¹ YING-TING LIN, LAURA BODINE, SANSHIRO ENOMOTO, MATTHEW KALLANDER, ERIC MACHADO, DIANA PARNO, HAMISH ROBERTSON, Univ of Washington, TRIMS COLLABORATION — The upcoming KATRIN and Project 8 experiments will measure the model-independent effective neutrino mass through the kinematics near the endpoint of tritium beta-decay. A critical systematic, however, is the understanding of the molecular final-state distribution populated by tritium decay. In fact, the current theory incorporated in the KATRIN analysis framework predicts an observable that disagrees with an experimental result from the 1950s. The Tritium Recoil-Ion Mass Spectrometer (TRIMS) experiment will reexamine branching ratio of the molecular tritium (T_2) beta decay to the bound state ($^3\text{HeT}^+$). TRIMS consists of a magnet-guided time-of-flight mass spectrometer with a detector located on each end. By measuring the kinetic energy and time-of-flight difference of the ions and beta particles reaching the detectors, we will be able to distinguish molecular ions from atomic ones and hence derive the ratio in question. We will give an update on simulation software, analysis tools, and the apparatus, including early commissioning results.

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