

Abstract Submitted  
for the DNP20 Meeting of  
The American Physical Society

**Beta Decay of Molecular Tritium**<sup>1</sup> DIANA PARNO, Carnegie Mellon University, TRIMS COLLABORATION — When tritium beta decay occurs within a TT or HT molecule, the resulting distribution of electronic, vibrational and rotational excitations of the final-state molecule modifies the shape of the beta spectrum. A robust understanding of this distribution is essential for experiments such as KATRIN and Project 8, which extract neutrino-mass information from the beta spectrum of TT decay. The Tritium Recoil Ion Mass Spectrometer (TRIMS), a coincidence time-of-flight mass spectrometer, has measured the probability with which the molecule dissociates following beta decay in HT and TT, a direct test of the theoretical final-state distribution. I will give an overview of the experiment, explaining design features that address known flaws in historical measurements that disagreed with the theory. Our results agree closely with theoretical expectations in both molecules.

<sup>1</sup>This work was supported by DOE Nuclear Physics Awards No. DE-SC00193204 and No. DE-FG-97ER41020.

Diana Parno  
Carnegie Mellon University

Date submitted: 26 Jun 2020

Electronic form version 1.4