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Towards a Precision Measurement of the Tritium Helium-3 Mass Difference[1] EDMUND MYERS, RAMAN RANA, BRIDGET WESSON, AUSTIN ERICKSON, Florida State University — Fitting a low-energy beta-decay spectrum near its endpoint is a direct method for determining the absolute mass scale of electron neutrinos. This is the subject of the large-scale tritium beta-decay experiment KATRIN. Besides a value (or a limit) for a sum of squares of neutrino mass eigenvalues, the fit to KATRIN data, with absolute energy calibration, will also produce a value for "the electron endpoint for zero neutrino mass" which is closely related to the Q-value for the beta-decay. Hence, an independent value for the tritium beta-decay Q-value, derived from the 3T - 3He mass difference, can provide a strong test of the systematics of KATRIN. The Florida State University precision Penning trap mass spectrometer has previously produced the most precise values of more than 26 atomic masses, many of which have application to neutrinoless double-beta-decay and to determining fundamental constants. The system is currently being modified for measurements of ions with small m/q ratio, and that are radioactive, to enable a precise measurement of the tritium helium-3 mass difference.

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