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Project 8: Using Radio Frequencies to Measure the Neutrino Mass

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It is well known that the neutrino masses affect the shape of the energy spectrum of tritium beta-decay electrons. However, experiments have yet to measure that distortion. The Project 8 experiment proposes to measure the spectral distortion in a novel way: using radio-frequency techniques to detect and measure the energies of the beta-decay electrons. We plan on measuring the radiation created from the cyclotron motion of the electrons in a strong magnetic field. I will report on the status of a prototype that is designed to demonstrate single-electron detection at energies near the tritium endpoint, 18.6 keV. I will also discuss the possibilities for scaling up to a neutrino-mass experiment, and the projected sensitivity.

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