

The Project 8 radiofrequency tritium neutrino experiment

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The Project 8 experiment aims to determine the electron neutrino mass by measuring the spectrum of tritium beta decay electrons near the 18.6 keV endpoint. Unlike past tritium experiments, which used electrostatic and magnetostatic spectrometers, Project 8 will detect decay electrons nondestructively via their cyclotron radiation emission in a magnetic field. An individual electron is expected to emit a detectable pulse of microwaves at a frequency which depends on the electron energy. Precise measurement of these pulse frequencies is a novel spectroscopy technique particularly well-suited for the high rate, high precision, low background needs of a tritium experiment. The collaboration is currently operating a prototype designed to detect single ^83mKr conversion electron decays in an 0.9T magnetic field. We report on recent activities on the prototype, and on progress towards the design of a large tritium experiment with new neutrino-mass sensitivity.

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