

Abstract Submitted  
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**Project 8: Single-Electron Spectroscopy via Relativistic Cyclotron Radiation** LUIZ DE VIVEIROS, Univ of California - Santa Barbara , PROJECT 8 COLLABORATION — The Project 8 experiment seeks to determine the neutrino mass via the precise measurement of the electron energy in beta decays. We have developed a novel technique called Cyclotron Radiation Emission Spectroscopy (CRES), which allows single electron detection and characterization through the measurement of cyclotron radiation emitted by magnetically-trapped electrons produced by a gaseous radioactive source. The advantages of this technique include scalability, excellent energy resolution, and low backgrounds. A prototype using a waveguide-coupled  $^{83\text{m}}\text{Kr}$  source in a 1 T magnetic field was constructed, and used to demonstrate the viability of this technique. We have recently reported the first observation and measurement of single-electron cyclotron radiation, emitted by the internal conversion electrons (at 17.8 keV and 30.4 keV) released in the decay of  $^{83\text{m}}\text{Kr}$ . We present the latest results of the ongoing prototype run, with a focus on signal detection and analysis techniques leading to an improved energy resolution of  $O(1 \text{ eV})$ .

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