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Project 8: Measuring the Neutrino Mass Using Cyclotron Radiation Emission Spectroscopy

Tuesday 14 May 2024 16:00 (15 minutes)

Project 8 is an experiment that seeks to determine the electron-weighted neutrino mass via the precise measurement of the electron energy in beta decays, with a sensitivity goal of $40\,\mathrm{meV/c^2}$. We have developed a 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 technique has been successfully demonstrated on a small scale in waveguides to detect radiation from single electrons, and to measure the continuous spectrum from tritium. In order to achieve the projected sensitivity, the experiment will require novel technologies for performing CRES using tritium atoms in a magneto-gravitational trap in a multi-cubic-meter volume. In this talk, I will present a brief overview of the Project 8 experimental program, highlighting the latest results including our first tritium endpoint measurement and neutrino mass limit.

Mini Symposia (Invited Talks Only)

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