



Contribution ID: 471

Type: **Poster**

Simulation and Signal Extraction for the Project 8 Phase III Free-Space CRES Demonstrator

The Project 8 experiment is designed to directly measure the electron neutrino mass using cyclotron radiation emission spectroscopy~(CRES).

Using the cyclotron frequency as a proxy for kinetic energy, the experiment aims to measure the tritium beta-decay electron endpoint spectrum trapped in 1 T magnetic field to reach neutrino mass sensitivity of 40 meV/c².

Following the successful demonstration of CRES with waveguides in Phase I and II, Phase III of Project 8 will utilize a larger free space experimental volume instrumented with antennas.

The Free-Space CRES simulation, detection, and energy reconstruction of radiation near 26 GHz is modeled using custom software.

This poster will discuss the progress in detector simulations and the signal extraction for the Free-Space CRES Demonstrator.

Mini-abstract

Project 8 develops simulation and signal extraction techniques for its free-space CRES demonstrator

Experiment/Collaboration

Project 8

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Session Classification: Poster session 3