

Abstract Submitted  
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**Simulation and design progress toward the Project 8 Phase III Free Space CRES Demonstrator**<sup>1</sup> PENNY SLOCUM, Wright Laboratory, Yale University, PROJECT 8 COLLABORATION — The Project 8 collaboration is developing a novel approach toward a direct neutrino mass measurement using Cyclotron Radiation Emission Spectroscopy (CRES). Beta decay electrons from a gaseous tritium source are trapped in a 1 T magnetic field where they emit 1 fW of cyclotron radiation for approximately 1 ms. The resulting electron energy spectrum is examined near its 18.6 keV endpoint for distortion due to the effective mass of the electron neutrino. Phases I and II of Project 8 have demonstrated this new spectroscopic technique successfully in waveguides. The next advancement of the experiment will be implemented in free space with radiation to be detected using a phased array of antennas. We examine design constraints deriving from systematic effects in the free space experiment, using the Locust simulation software. We discuss the results of the simulation effort and its implications for design work.

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