Contribution ID: **518** Type: **Poster**

Bayesian analysis of Project 8's sensitivity to the neutrino mass scale and ordering

Project 8 aims to determine the absolute neutrino mass scale from a tritium beta spectrum using Cyclotron Radiation Emission Spectroscopy (CRES). Bayesian analysis is suited for direct mass measurements because it incorporates non-Gaussian features—like the mass's physical bound at zero—without invoking approximate interval building techniques. Bayesian methods also separate inference from result-reporting, revealing how both affect accuracy. Project 8 devised a new Bayesian beta spectrum model and applied it to the first CRES tritium spectrum. We analyze pseudo-spectra with this model, then observe how often the inferred mass scale and hierarchy agree with "truths." 90% credible intervals contain the true mass in >90% of analyses, validating our model. For a design under consideration, we find Project 8 can achieve its goal of measuring m_β within 40meV with ∼1 year of data. Masses >500meV can be measured within 90% intervals of width ≈5meV.

Mini-abstract

Bayesian study shows Project 8 can measure m_β within 40meV (90% C.I.) with ~1 year of data.

Experiment/Collaboration

Project 8

Primary author: WEISS, Talia (Massachusetts Institute of Technology)

Presenter: WEISS, Talia (Massachusetts Institute of Technology)

Session Classification: Poster Session 2