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## Frequency-based decay electron spectroscopy

*Tuesday, December 8, 2020 1:00 PM (40 minutes)*

Precision measurements of  $\beta$ -decay spectra can provide exquisitely sensitive tests of various predictions and underlying symmetry assumptions of the Standard Model (SM) of Particle Physics. Possible symmetry violations can alter the shape of  $\beta$ -decay spectra in characteristic ways. Beyond SM physics e.g. causes the finite masses of neutrinos that alter the  $\beta$ -decay spectrum of tritium in a predictable but still undetectable way. In a first step to design an experiment with a sensitivity of  $40 \text{ meV}/c^2$  to the neutrino mass scale the Project 8 collaboration has recently demonstrated a novel, frequency-based electron spectroscopy technique. Cyclotron Radiation Emission Spectroscopy (CRES) determines the electron's kinetic energy from the feeble cyclotron radiation emitted by an electron spiralling in a magnetic trap. I will present the basics of CRES and results obtained with mono-energetic conversion electrons from  $^{83\text{m}}\text{Kr}$  as well as preliminary results from measurements using molecular tritium. I will discuss the prospect of CRES in the context of precision  $\beta$ -decay experiments of the next generation, in particular with a focus on the neutron decay spectrum.

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**Primary author:** FERTL, Martin (Johannes Gutenberg Universität Mainz)

**Presenter:** FERTL, Martin (Johannes Gutenberg Universität Mainz)

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