

# Spring 2025 Physics Colloquium

Monday, February 3<sup>rd</sup>

10:00 AM

PAS 201 or Zoom

(<https://arizona.zoom.us/j/81283840289>)

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### Low-energy nuclear physics for fundamental science

**Abstract:** Precision measurements involving nuclei are at the cutting edges of nuclear physics and testing the Standard Model (SM) of physics. For instance, precision beta decay measurements have the potential to constrain beyond SM (BSM) physics at TeV scales. To interpret these experiments, it is crucial to have theoretical predictions of relevant quantities that are both accurate and comparably precise, as well as an understanding of how the underlying nuclear dynamics influences observables. In this colloquium, I will overview recent calculations of electroweak processes that use quantum Monte Carlo (QMC) computational methods to solve the many-body Schrodinger equation. The QMC approach retains the complexity of many-nucleon dynamics, and provides highly accurate computations of nuclear observables. Recent calculations of nuclear beta decay will be the primary focus of the talk, as they highlight both how one performs model validation and how nuclei can be used to search for BSM physics. I will also discuss studies of electron scattering, and how they may motivate new precision measures at rare isotope facilities in the future.

*\* Refreshments served in PAS 218 at 9:30 AM – 10:00 AM \**

