

# Cyclotron Colloquium, Tuesday, April 6 at 3:45 PM

## **Designer Nuclei: New possibilities with the Facility for Rare Isotope Beams**

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### Abstract:

A quest of experimental nuclear science is to synthesize atoms made of all possible combinations of neutrons, protons and electrons. In part, based on our current capabilities for creating new isotopes, our understanding of atomic nuclei has changed dramatically. Many of the so called basic properties of atomic nuclei turn out to not be as universal as we thought. Equally important in developing a more complete picture has been the development, over that last decade, of new theoretical approaches that allow modeling with far fewer approximations. The progress is such that we are now getting close to answering fundamental questions such as can QCD describe atomic nuclei, what is the nature of neutron star matter, and what does the elemental abundances in a stars tell us about their history? A next step will be the construction of the Facility for Rare Isotope Beams. When completed after 2017, it will produce most of the astrophysically interesting isotopes needed to model element formation in the universe, and allow specific, key measurements of nuclear properties needed for progress in nuclear theory.