Nuclear Seminar

High-precision Penning trap mass spectrometry of stable and long-lived isotopes

Monday

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4 P.M.

Rm 124 NSH

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The mass of an atom is one of its most fundamental properties that, through Einstein's relation $E = mc^2$, provides direct information on the energy required to bind a particular nucleus together. The mass difference between the relevant parent and daughter atoms defines, for example, the Q-value for single and double β-decay and electron capture (εc). These quantities are important for experiments that aim to determine the absolute neutrino mass scale, for experimental searches for neutrino-less double β-decay and neutrino-less double electron capture, and for identifying candidates that could undergo weak decay processes, such as very low energy β-decays. Over the last few decades the Penning trap, which consists of a strong uniform magnetic field and a weaker quadrupole electric field, has become the tool of choice for performing precise and accurate atomic mass determinations. In this talk I will discuss β-decay Q-value measurements performed using Penning traps at Florida State University and Michigan State University, and will describe a new high-precision Penning trap for measurements with long-lived radioactive isotopes that is currently under development at Central Michigan University.

Refreshments served prior to the seminar in Rm 124.

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