Tuesday
Nov 5th
At 3:45 pm

Ab initio nuclear theory for beyond standard model physics

Abstract:

Long considered a phenomenological field, breakthroughs in many-body methods together with our treatment of nuclear and electroweak forces are rapidly transforming modern nuclear theory into a true first- principles, or ab initio, discipline. In this talk I will discuss recent advances, which expand the scope of ab initio calculations to global calculations in the light to heavy mass regions. When based on consistently derived two- and three-nucleon forces, these powerful approaches allow first predictions of the limits of nuclear existence and the evolution of magic numbers. In particular I will focus on recent extensions to fundamental problems in nuclear-weak physics, including a proposed solution of the long- standing quenching puzzle in beta decays, calculations of neutrinoless double-beta decay for determining neutrino masses, and WIMP-nucleus scattering cross sections relevant for dark matter direct detection searches.

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Refreshments will be served at 3:30 pm