Nuclear Seminar

Using transfer reactions to probe nuclear structure properties relevant to neutrinoless double beta decay

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Monday, September 16 ◆ 4 P.M.
Room 124 Nieuwland Science Hall

If neutrinoless double beta decay were to be observed, its half-life would allow for a determination of the absolute neutrino-mass scale. This relies on the value of the nuclear matrix element for the decay being known. These matrix elements are not directly sampled by any other physical process and their values, which are by necessity taken from theoretical calculations, are rather uncertain. We have carried out a program of measurement to constrain the calculations. Data from single-nucleon transfer reactions have allowed for a detailed description of the energy and occupancy (or vacancy) of the ground-state valence orbitals for several neutrinoless double beta decay candidates and how they change in the decay process. Pair transfer reactions have been used to assess the validity of the BCS description of pairing in these nuclei, which is assumed in QRPA calculations. We have focused on the ^{76}Ge-^{76}Se, ^{100}Mo-^{100}Ru, and ^{130}Te-^{130}Xe candidates. An overview of the program will be presented, with particular focus on the methodology.

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