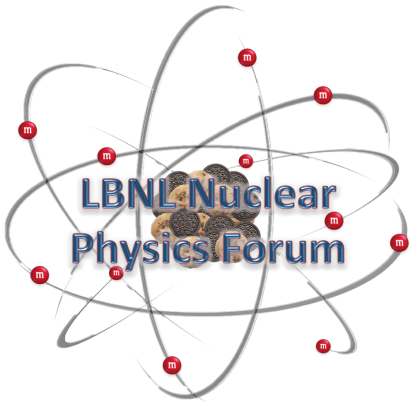

LBNL Nuclear Physics Forum

Thursday, May 4, 2017 @ 11:00 am

Building 88 Lounge (2nd floor)

Cookies and coffee available from 10:15am

Dr. Benjamin P. Kay

Physics Division, Argonne National Laboratory

"Nuclear matrix elements for neutrinoless double beta decay — a challenge to experimental and theoretical nuclear-structure physics"

Neutrinoless double beta decay is on the frontier of attempting to understand neutrinos — whether they are their own antiparticles. If observed, to understand the implications of the half-life, the nuclear matrix elements need to be predicted. Factors of two-to-three discrepancies between various theoretical calculations are found in the literature, which translates to as much as an order of magnitude in half-life. Such discrepancy is a substantial obstacle for technology choices for new experimental searches and for interpreting any potential results. To constrain these theoretical calculations, experimental constraints are important. Focusing on three of the most promising candidates, ^{76}Ge, ^{130}Te, and ^{136}Xe, we have mapped out the nucleon occupancies of the initial and final ground states involved in the respective decays, and how they change in the decay. We have demonstrated that our analyses have minimal model dependency. The rearrangement of nucleons should be accurately described by any model used to calculate the nuclear matrix elements.