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Theoretical approaches to neutrinoless double beta decay from the ground up

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While the discovery of non-zero neutrino masses is among the most important accomplishments by physicists in the past century, it is still unknown how and in what form these masses arise. Lepton number-violating neutrinoless double beta decay is a natural consequence of Majorana neutrinos and many BSM theories, and, if observed, could potentially explain the matter/anti-matter asymmetry in the universe. Several experimental searches for these processes using nuclear sources are planned and/or underway worldwide, and understanding quantitatively how neutrinoless double beta decay would manifest in nuclear environments is key for interpreting any observed signals. In this talk I will give a brief overview of current theoretical approaches to understanding neutrinoless double beta decay from the microscopic BSM mechanisms, to the combined efforts of effective field theory and lattice QCD on quantifying few-hadron processes, to the many-body approaches necessary for calculating observables for experimentally relevant nuclei.