Progress and Challenges in Neutrinoless Double Beta Decay

Monday, 15 July 2019 - Friday, 19 July 2019

ECT*

Scientific Programme

All talks will be plenary, and last 45 minutes + 15 minutes of questions. The sessions will be thematically coherent, and organized around the main area of expertise involved in the workshop (Lattice QCD, Chiral EFT, few body, many body nuclear theory).

The determination of the NLDBD transition operators for the standard mechanism of exchange of light Majorana neutrinos

The establishment of strategies to include two-body currents in the calculation of nuclear matrix elements. In a second-order operator two-body currents in general give raise to four-body operators, which are difficult to handle in most many-body approaches

Test nuclear matrix element calculations in very light nuclei, comparing quantum Monte Carlo results with other many-body approaches, such as the nuclear shell model, which can be applied in heavier nuclei directly relevant for experiments

Approximate test of the role of two-body currents for the nuclear quantum Monte Carlo calculations in very light-nuclei

Determine which observables, or set of observables, can be used to validate nuclear matrix-element calculations: e.g. single-beta decay, two-neutrino double-beta decay, double

charge-exchange reactions, or muon-capture inelastic neutrino scattering (that operate in a similar momentum-transfer regime as NLDBD)

Discuss the connection with collider and phenomenology.