

## The NEXT double beta decay experiment

The neutrino is the most elusive of the standard model particles, however, the huge abundance of this type of particle in the universe coupled with its low interaction cross section make it an important component in most theories which describe the evolution of the early universe. One of the key unknowns which remain to be understood concerns the fundamental nature of these particles, are neutrinos Dirac or Majorana fermions? Experimentally, the most feasible way to determine the nature of the neutrino is by discovering neutrino-less double beta decay. If this decay can be shown to take place, it would be a clear indication of the Majorana nature of the neutrino.

In this seminar I will describe the field and the motivations for the study of these phenomena while giving an overview of current and past experiments before introducing NEXT. NEXT searches for the neutrino-less double beta decay of  $^{136}\text{Xe}$  using a gaseous TPC. Using electroluminescent amplification of the ionisation signal and topological reconstruction, NEXT is able to achieve energy resolution of better than 1% FWHM while rejecting potential backgrounds from natural radioisotopes in the detector materials.