Contribution ID: **116** Type: **Plenary Talk**

# Theoretical challenges in double beta decay

*Friday 27 October 2017 08:30 (30 minutes)*

Double beta decay (DBD) is a nuclear process with the longest lifetime measured until present, which study presents a great interest. Indeed, its possible neutrinoless double beta ($0\nu\beta\beta$) decay mode is a beyond Standard Model (BSM) process whose discovery would clarify if the lepton number is conserved, decide on the neutrinos character (are they Dirac or Majorana particles?) and give a hint on the scale of their absolute masses [1]. Theoretically, the study of $0\nu\beta\beta$ decay involves the accurate computation of the nuclear matrix elements (NME) and phase space factors (PSF), two key quantities entering the lifetimes of this process. In my talk I will make first a short review on the actual challenges to calculate the NME and PSF for DBD [2]-[4]. Then, I will show how from the study of $0\nu\beta\beta$ decay one can constrain BSM parameters related to the neutrino mass and Lorentz violation in weak decays.

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**Session Classification:** Plenary Talks

**Track Classification:** High Energy Physics, Astrophysics and Cosmology (covering Hadron Structure, Phases of Nuclear Matter, QCD, Precision Measurements with Nuclei, Fundamental Interactions and Neutrinos)