THEORETICAL CHALLENGES IN NEUTRINOLESS DOUBLE BETA DECAY

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Neutrinoless double beta ($0\nu\beta\beta$) decay 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 $0\nu\beta\beta$ 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'll make first a short review on the actual challenges to calculate the NME and PSF for double-beta decay (DBD) [2]-[4]. Then, I'll show the influence that different approximations and parameters used in computation have on their computed values, outlining the advantage to calculate simultaneously products of NME and PSF, instead of providing separately their values. This would help in a better interpretation of the DBD experimental data.