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QRPA and PQRPA studies of ordinary muon capture processes

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The proton-neutron quasiparticle random-phase approximation (QRPA) and the particle number projected QRPA(PQRPA) are used to study the ordinary muon capture (OMC) reaction. In the present work, we have applied both methods to calculate the OMC on the 0^+ ground state of ^{76}Se and ^{136}Ba and included a comparison with the results obtained in shell model calculations. The nuclei ^{76}Se and ^{136}Ba are the daughter nucleus in the neutrinoless double beta ($0\nu\beta\beta$) decays of ^{76}Ge and ^{136}Xe , respectively. The analysis of both processes, the OMC reaction and the ($0\nu\beta\beta$) decay, shows the complementarity existing between a direct reaction mechanism and a decay. Own to this complementarity we have explored the range of possible values of nuclear matrix elements which are relevant for the determination of the Majorana neutrino mass.

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