

Ordinary muon capture studies by means of gamma-spectroscopy

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HPGe detectors were used to make a precise measurement of the γ -ray spectrum produced following ordinary (non-radiative) capture of negative muons by isotopically-enriched (^{48}Ti , ^{76}Se , ^{82}Kr , ^{106}Cd and ^{150}Sm) and natural targets (Se, Kr, Cd and Sm). By investigating energy and time distributions, the lifetime of negative muons in the different isotopes was deduced. A detailed analysis of the intensity of the γ -lines enabled the extraction of the relative yields of several daughter nuclei. The partial rates of muon capture to numerous excited levels of the ^{48}Sc , ^{76}As and ^{106}Ag isotopes (considered to be virtual states of the intermediate odd-odd nuclei in the $\beta\beta$ decay of ^{48}Ca , ^{76}Ge and ^{106}Cd respectively) were also extracted. These rates are important as an experimental input for the theoretical calculation of the nuclear matrix elements in $\beta\beta$ decay.

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