

Frontiers in Gamma Ray Spectroscopy

FIG18

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Isomers and intrinsic excitations at high spin in ^{201}Tl

Content :

Isotopes of Tl ($Z=81$) near the line of stability have weakly-deformed oblate to near-spherical shapes. With increase in neutron number approaching $N=126$, intrinsic excitations dominate the yrast line. The nucleus ^{201}Tl lies in this transitional region. Excited states at high spin with predominantly intrinsic configurations were studied, with a focus on isomeric levels. The data were obtained from two experiments, one with the Gammasphere detector array at Argonne National Laboratory, USA, and the other with the INGA array at the Inter-University Accelerator Centre, New Delhi. A number of histograms were created, up to three dimensions, involving energy and time parameters. The decay scheme was extended up to spin $\sim 25 \hbar$ and an excitation energy ~ 8.5 MeV with the inclusion of many new transitions. Metastable states with half-lives ranging from a few nanoseconds to the sub-microsecond region were established using the centroid-shift method or through fitting exponential decay. At high spin, intrinsic configurations with dominant contributions from high- j orbitals are found to be favored. Preliminary calculations of energies of multi-quasiparticle states have been performed using a Woods-Saxon potential with universal parameters. Detailed results from this work will be presented.

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