

Octupole Collectivity in ^{172}Pt

Aysegul Ertoprak^{1,2}, Bo Cederwall¹, Chong Qi¹ et al.

¹ Royal Institute of Technology - KTH, Stockholm / Sweden

² Istanbul University, Science Faculty, Physics Department, Istanbul / Turkey

Abstract

Excited states in the extremely neutron-deficient nucleus ^{172}Pt were populated in the $^{96}\text{Ru}(^{78}\text{Kr}, 2p)$ and $^{92}\text{Mo}(^{83}\text{Kr}, 3n)$ reactions at the Accelerator Laboratory of the University of Jyväskylä (JYFL), Finland. The level scheme has been extended up to an excitation energy of 5 MeV and tentative spin-parity assignments up to 18^+ . Linear polarization and angular distribution measurements were used to determine the electromagnetic E1 character of the dipole transitions connecting the positive-parity ground state band, firmly establishing it as a negative parity band. In addition, a new state at 1466 keV excitation energy has been assigned as the lowest member of the negative-parity band. The measurements provide strong evidence that the spin-parity of this state is 3^- and the observation of its E3 decay to the ground state, provides direct evidence for the octupole collectivity in ^{172}Pt . Large-scale shell model (LSSM) and total Routhian surface (TRS) calculations have been performed, supporting the interpretation of the 3^- state as a collective octupole vibrational state.