Abstract

Nuclear Coulomb excitation in H-like ^{229}Th, exploiting the different nuclear shapes, has been studied in a non-relativistic regime in the presence of a laser field. The nuclear transition is caused by the laser-driven oscillations of electron in an atom. Using the time-dependent perturbation theory, the expressions for the transition probability for different nuclear shapes have been derived. We compare the results of prolate-and-oblate shaped nuclei with spherical shapes for dipoles and quadrupoles, and the results show an appreciable increase in the transition probability. Additionally, we examine the outcomes of dipoles and quadrupoles for various nuclear shapes, and the findings indicate that dipoles have a higher transition probability than quadrupoles.