Abstract

The Hydrogen-like ions (HLIs) are studied in the super-intense laser field. The particular cases of electronic and munoic systems for the HLIs are considered. The high binding energies of these systems enable us to probe the nucleus indirectly under intense laser field. We use the laser-particle-nucleus approach to study the nucleus by keeping ourselves in the soft X-ray laser regime . The laser driven particle electron/muon oscillates under the intense laser field and generates a time dependent field. To study the Stark shift in the nuclear levels we have considered the electric field generated by the oscillating particles and analyze its interaction with the nuclear electric dipole. The effect is studied by considering the dynamic charge density of the system under the incident laser field. The isotopic, isotonic and isobaric effects on the evaluation of dynamic nuclear Stark shift are also studied. For the evaluation of Zeeman shift in the nuclear levels the magnetic field associated with the field generated due to laser driven oscillations of electron/muon is considered to interact with the magnetic dipole of the nucleus. The study is carried out to predict a trend along the periodic table based upon the results calculated for a number of systems.