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SIMULTANEOUS ELECTRON-PHOTON EXCITATION OF ATOMIC TARGETS

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Electron-atom scattering in the presence of a laser field is a rapid and fast growing subject. This study is very useful from the point of view of plasma heating, population of metastable states and gas break down phenomenon. The electron atom scattering in the presence of a resonant laser field was investigated by so many theoreticians. Some of them have derived a time dependent close coupling approach for particle scattering by a two state atom, generated by the strong near resonant field. In present paper, I would propose two phases. The first phase is devoted to the study of electron Hydrogen atom scattering in presence of electromagnetic field. The variation of the cross section with laser intensity and with incident electron energy is too investigated for the optically forbidden s-s and s-d type transitions. The effect of laser on the individual magnetic sub-state excitation when the final state is a'd' state, is also observed. The variation of differential cross sections with the scattering angle at incident electron energy is also presented at different laser intensities. In the second phase of proposed paper, the above study would be extended to Helium atom. The use of pseudo-states as intermediate states is also being taken into account. Here, I would assume that laser is non-resonant with any atomic level. I predicted major changes in the joint excitation cross section of Helium atom due to a multi-pole interference effect, near the resonant frequencies corresponding to the quadrupole allowed intermediate states. As for as my knowledge, such effects have not studied so far. The present calculation is done by taking the asymptotic wave functions hence extracted the phase shift accordingly. The detailed results shall be presented as well discussed at the venue of conference.

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