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Simultaneous electron-photon excitation of atomic targets

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Atomic collision processes control the composition of upper and lower atmosphere. Such studies are helpful to understand the facts behind the ozone layer depletion by simple series of atomic collisions. An accurate knowledge of the rates for electron excitation of atoms in presence of electromagnetic field is used in modeling of stellar plasmas, fusion plasmas and laser induced plasmas. Electron-atom scattering in the presence of a laser field is a rapidly 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. The process of joint atomic excitation is quite different from the normal electron atom excitation process in that the total cross section here shows resonant structures when the laser frequency is varied. At near resonant frequencies the cross sections are substantially larger compared to the field free cross sections. In present paper, I would propose two phases. The first phase is devoted to the study of electron. That is 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 far as my knowledge, such effects have not been 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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Smart grid performance enhancement thorough radio over fiber based on microring resonator system

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Smart grid (SG) systems form the backbone of various services that provide comfort and efficiency enhancements. Increasing numbers of SG users cause additional demands by applications on the SG, and this trend eventually leads to the SG being unable to deliver services with sufficient quality. A system of optical and wireless access technologies, namely radio over fiber (RoF), is proposed here for adoption in SG systems (SG-RoF) in order to ensure provision of adequate capacity in line with transmission bandwidth service requirements. This paper details a microring resonator (MRR) system for use in SG-RoF systems, whereby extra optical carriers are generated so as to increase the number of serviceable remote antenna units (RAUs). A number of very useful and widely used smart grid applications, namely video surveillances and advanced metering data, are also described in the context of the SG-RoF. The performance of well-known algorithms, such as proportional fairness, modified largest weighted delay first, exponential proportional fairness and exponential rule, are evaluated in this work to determine the optimal candidate for use in the proposed system.

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