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Free-free transitions in the presence of laser fields at very low incident electron energy A.K. BHATIA, NASA/Goddard Space Flight Center, CHANDANA SINHA, Theor. Phys. Dept. Indian Association for the Cultivation of Science — We study the free-free transition in electron-hydrogenic systems in ground state in presence of an external laser field at very low incident energies. The laser field is treated classically while the collision dynamics is treated quantum mechanically. The laser field is chosen to be monochromatic, linearly polarized and homogeneous. The incident electron is considered to be dressed by the laser in a nonperturbative manner by choosing a Volkov wave function for it. The scattering wave function for the electron is solved numerically by taking into account the effect of the electron exchange, short-range as well as of the long-range interactions to get the S and P wave phase shifts while for the higher angular momentum phase shifts, the exchange approximation has only been considered. We calculate the laser-assisted differential cross sections (LADCS) for the aforesaid free-free transition process for single photon absorption/emission. The laser intensity is chosen to be much less than the atomic field intensity. A strong suppression is noted in the LADCS as compared to the field free (FF) cross sections. Unlike the FF ones, the LADCS exhibit some oscillations having a distinct maximum at a low value of the scattering angle depending on the laser parameters as well as on the incident energies.

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