

School of Physical Sciences, DCU, Seminar Series

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Ionization of hydrogen with KeV photons

Abstract:

In a recent Letter [H. Bachau, M. Dondera and V. Florescu, Phys. Rev. Lett. 112, 073001(2014)] we have considered the hydrogen atom in interaction with an electromagnetic field consisting in the coherent superposition of two keV pulses centered around two frequencies ω_1 and ω_2 that differ by a few atomic units. The analysis of the results obtained from the resolution of the time dependent Schrödinger equation focused on stimulated Compton scattering (SCS). We have developed in parallel an approach based on perturbation theory and it proved to be an appropriate and useful tool in complement of the non-perturbative approach. We have shown that non-dipole effects must be taken into account in order to describe SCS and that, in certain conditions, SCS may compete with one-photon ionization. We present a detailed analysis of the electron spectra (total generalized cross sections, energy and angular electron distributions) obtained at $\omega_1 = 55$ a.u. and values of ω_2 ranging from 50