Multiphoton Ionization of Hydrogen Atoms in a Circularly Polarized Strong Radiation Field[1] A.S. TITI, G.W.F. DRAKE, University of Windsor — The scattering matrix for the multiphoton ionization of a hydrogen atom in a circularly polarized strong radiation field, where the Coulomb potential is also included, is calculated. This leads to a divergent scattering matrix. By carrying out a unitary transformation to a frame in which the electron sees an oscillating nucleus, the singularity can be isolated and removed. The expression for the resulting nonsingular scattering matrix is written in terms of Bessel functions (representing direct single scattering) and Anger functions (representing rescattering). Both contributions interfere quantum mechanically. Intuitively, this provides a direct link to a path integral formulation of the problem. Finally, to compare our calculations with other calculations and to experimental results, the angular distribution of the ejected electrons is computed.

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