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Electron impact single ionization of methane. LORENZO UGO ANCARANI, Universite de Lorraine, Metz, France, CARLOS MARIO GRANADOS-CASTRO, Martin-Luther-Universitat Halle-Wittenberg, Germany — The electron impact single ionization of the outer valence $1t_2$ and the inner valence $2a_1$ orbitals of methane is investigated theoretically. In a first Born approximation, the scattering wave function describing the ejected electron is expanded in a set of Generalized Sturmian Functions [1] with appropriate Coulomb asymptotic conditions; this allows us to extract the scattering amplitude directly from the expansion coefficients, without the need of calculating a transition matrix element. Triple differential cross sections, calculated for several coplanar asymmetric geometries, are compared with other theoretical models (in an absolute scale), and with two sets of relative scale measurements with incident energies of 500 eV or 250 eV [2,3]. The binary to recoil ratio is analyzed as a function of the momentum transfer. For the outer valence $1t_2$ and for given kinematical conditions, we predict a double peak structure in the cross section binary region, a clear signature of the p-nature of the molecular orbital. [1] C. M. Granados-Castro and L. U. Ancarani, Eur. J. Phys. D 71, 65 (2017). [2] A. Lahmam–Bennani et al., J. Phys. B, 42, 165201 (2009). [3] N. Isik et al., J. Phys. B, 49, 065203 (2016).

Lorenzo Ugo Ancarani
Universite de Lorraine, Metz

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