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Proton-helium double ionization: exploring different momentum-transfer regimes. LORENZO UGO ANCARANI, Universite de Lorraine, Metz, France, A.I. GOMEZ, G. GASANEO, Universidad Nacional del Sur, Bahia Blanca, Argentina, M.J. AMBROSIO, Kansas State University, Manhattan, USA, D.M. MITNIK, IAFE, CONICET-UBA, Argentina — We present a systematic study of fully differential cross sections (FDCS) for the double ionization of helium by fast proton impact, considering different kinematic conditions going from intermediate momentum transfers up to within the impulsive regime. Our formalism treats the projectile-target interaction up to first order, but the intra-target ones to all orders. Within this framework, we deal with a first order three-body non-homogeneous equation whose driven term depends parametrically on the momentum transfer. We solve it numerically with a Generalized Sturmian Function approach [1,2], and the ionization transition amplitude is extracted directly from the asymptotic range of the scattering wavefunction for the perturbed target. Our approach yields satisfactory agreement with the relative data measured for protons impinging with 6 MeV [3]. We explore how the binary, recoil and back-to-back structures in the FDCS change with the excess energy and momentum transfer. [1] M. J. Ambrosio et al. Phys. Rev. A 92, 042704 (2015). [2] M. J. Ambrosio et al., Eur. Phys. J. D 71, 127 (2017). [3] D. Fischer et al., Phys. Rev. Lett. 90, 243201 (2003).

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