

Abstract Submitted
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Excitation-ionization processes in K-shell vacancy production in Li by fast bare oxygen ions: doubly-differential cross sections¹ M.D. ŚPIEWANOWSKI, York University, L. GULYÁS, Institute for Nuclear Research, Hungarian Academy of Sciences (ATOMKI), M. HORBATSCH, T. KIRCHNER, York University — Recent theoretical work has demonstrated that *K*-shell vacancy production in Li by 1.5 MeV/amu O⁸⁺ impact cannot be understood as a simple one-electron process. Rather, a certain two-electron excitation-ionization process, in which the valence electron is removed, while one of the *K*-shell electrons makes a transition to an excited state, was found to give the dominant contribution to the singly-differential cross section at low to intermediate energies of the outgoing electron [1]. In this work, we extend the calculations to the doubly-differential level and present cross sections which are differential in the electron energy and the transverse momentum transfer [2]. The calculation involves the combination of impact-parameter-dependent single-electron amplitudes and a two-dimensional Fourier transformation of the resulting multielectron amplitudes to obtain momentum-transfer-dependent transition matrix elements. Results are found to be in good agreement with recent measurements, especially at low outgoing electron energy, and underline the importance of two-electron excitation ionization in this collision system. [1] T. Kirchner et al., Phys. Rev. A 89, 062702 (2014); [2] M. D. Śpiewanowski et al., Phys. Rev. A 93, 012707 (2016)

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