Cusp electron studies in MeV collisions of dressed projectiles with gas targets

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The APAPES installation operating at the tandem Van de Graaff accelerator laboratory of NCSR "Demokritos" [1] is currently fully operational providing a solid research ground for the field of fast ion-atom collisions [2-4]. Recently, studies have been extended to cusp electrons related to the electron capture and loss to the continuum processes (ECC and ELC, respectively) [5]. Here, we report on such a combined experimental and theoretical study of cusp electrons emitted at zero degrees in few MeV/u collision energies of low-Z dressed projectiles with multielectron gas targets. The experiments were conducted using the ZAPS setup, appropriate for zero-degree measurements [6], while the theoretical calculations were performed using state-of-the-art distorted wave approaches [7]. Details on the role of the projectile electronic structure, as well as the gas target choice, in the formation of the cusp electron peak are discussed.

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