Abstract Submitted
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Origin of ring-like structures in the distribution of fast electrons in slow collisions of He^{2+} with He[1] S.Y. OVCHINNIKOV, University of Tennessee & Ioffe Institute, J.S. STERNBERG, University of Tennessee, D.R. SCHULTZ, Oak Ridge National Laboratory, J.H. MACEK, University of Tennessee & Oak Ridge National Laboratory — Fully correlated, 4-dimensional lattice calculations of the electron spectra for transfer ionization in slow collisions of He^{2+} with He reveal ring-like structures in the distribution of fast electrons. The structures are manifestations of the interference of two channels of direct ionization occurring during the incoming portion of the collision. In the evolution of the initial electronic state, the diabatic $^1\Sigma_g^+(2p\sigma^2)$ term crosses the $^1\Sigma_g^+(1s\sigma 3d\sigma)$ term and two-electron transitions at this crossing define the two channels for direct ionization . In the dominant channel, $S_{d\sigma}$–promotion occurs via two-electron transitions from the initial adiabatic $^1\Sigma_g^+(2p\sigma^2)$ state to the $^1\Sigma_g^+(1s\sigma 3d\sigma)$ state and then to the continuum. In the subdominant channel, the $S_{p\sigma}$–promotion occurs from the initial adiabatic $^1\Sigma_g^+(2p\sigma^2)$ state directly to the continuum. The difference in phases for the evolution of the system along the $1s\sigma$ and $2p\sigma$ potential curves during of the outgoing part of the collision produces the ring-like structures in the transfer ionization channel.

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