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Exact Quantum Treatment of Continuum Electrons TECK-GHEE LEE, Oak Ridge National Lab and U of Kentucky, S. YU OVCHINNIKOV, Oak Ridge National Lab and U of Tennessee, JAMES STERNBERG, V. CHUPRYNA, U of Tennessee, D.R. SCHULTZ, Oak Ridge National Lab, J.H. MACEK, Oak Ridge National Lab and U of Tennessee — An exact three-dimensional (3D) quantum mechanical treatment is presented for the evolution of continuum electrons in the fields of moving ions. The novel method introduced here allows one to propagate the continuum electrons to asymptotically large internuclear distances and obtain stable ejected electron momentum spectra. As a result, our computations resolve long standing controversies concerning top-of-barrier, superpromotion and cusp electron momentum distributions. While the method is employed for protons impact ionization of atomic hydrogen, it is general and readily applied to any problems involving electron motion in the presence of time-dependent external fields.

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