

Abstract Submitted  
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**Vortex Creation and Dynamics in Atoms by Short Electric Field Pulses.**<sup>1</sup> TECK-GHEE LEE, Physics Division, Oak Ridge Nat'l Lab, Oak Ridge, TN 37831, SERGE OVCHINNIKOV, JAMES STERNBERG, JOE MACEK, Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37496, DAVID SCHULTZ, Physics Division, Oak Ridge Nat'l Lab, Oak Ridge, TN 37831 — We report the creation of vortex rings when an atom is exposed to very short electric field pulses. A full-dimensional time-dependent Schrodinger equation has been used to investigate the creation and the time-dependent dynamics of these vortex rings within the limit of weak and strong electric field intensities. The underlying conditions that control the vortex creation, collapse and survival are identified. We find that (i) the vortices can be created by both weak and strong electric fields, (ii) the number of vortices depends on the pulse duration and (iii) the vortex trajectories depend on the pulse intensities. Our study indicates that similar phenomena will occur for intense laser-atom interactions.

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