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The Volkov Basis: Improved Simulation of Time Evolution for Systems in Intense Laser Fields DANIEL KIDD, CODY COVINGTON, KALMAN VARGA, Vanderbilt University — By employing a basis comprised of time-dependent Volkov states, one is afforded improved accuracy for the simulation of electron dynamics in intense laser fields as compared to propagation using other popular bases such as that of plane waves or the real-space grid representation. As a result, larger time-steps are allowed leading to faster computational run times and the ability to describe longer time-scale phenomena. One-dimensional, one-electron time-dependent simulations of both finite and periodic systems under laser fields using the Volkov basis are presented and compared to existing methods. The basis is also incorporated in three-dimensional time-dependent density functional theory calculations.

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