

Femtosecond Evolution of Spatially Inhomogeneous Carrier Excitations: Part II: Stochastic Approach and Grid Implementation

T. Gurov, E. Atanasov, I. Dimov, V. Palankovski, S. Smirnov

The Wigner equation discussed in Part I has been already investigated for the homogeneous case with various Monte Carlo (MC) approaches. In particular, spherical and cylindrical transformations have been used to reduce the dimension in the \mathbf{k} -space. In this work we include real space dependence through the initial condition and do not apply symmetry transforms. A backward Monte Carlo algorithm in the Cartesian \mathbf{k} -space and the real space coordinates is developed using variance reduction techniques. The computational complexity and the stochastic error are

investigated numerically. A clear advantage with respect to the approaches relying on the symmetry of the task is demonstrated. Parallel implementation is realized on a GRID infrastructure.