Selected Abstracts from Other Physical Review Journals

Abstracts of papers that are published in other Physical Review journals and may be of interest to Physical Review A readers are printed below.

Extension of the mapped Fourier method to time-dependent problems. Ulrich Kleinekathöfer and David J. Tannor *Department of Chemical Physics, Weizmann Institute of Science, 76100 Rehovot, Israel* (Received 12 April 1999)

A numerical method is described for integration of the time-dependent Schrödinger equation within the presence of a Coulomb field. Because of the singularity at $r=0$, the wave packet has to be represented on a grid with a high density of points near the origin; at the same time, because of the long-range character of the Coulomb potential, the grid must extend to large values of r. The sampling points are chosen, following E. Fattal, R. Baer, and R. Kosloff [Phys. Rev. E **53**, 1217 (1996)], using a classical phase space criterion. Following those workers, the unequally spaced grid points are mapped to an equally spaced grid, allowing use of fast Fourier transform propagation methods that scale as $N \ln N$, where N is the number of grid points. As a first test, eigenenergies for the hydrogen atom are extracted from short-time segments of the electronic wave-packet autocorrelation function; high accuracy is obtained by using the filter-diagonalization method. As a second test, the ionization rate of the hydrogen atom resulting from a half-cycle pulse is calculated. These results are in excellent agreement with earlier calculations. [S1063-651X(99)14210-7] [Phys. Rev. E **60**, 4926 (1999)]