Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Quantum dynamics in strong fields with Fermion Coupled Coherent States ADAM KIRRANDER, ITAMP, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA 02138, USA, DMITRII V. SHALASHILIN, School of Chemistry, University of Leeds, Leeds LS2 9JT, United Kingdom — We present a new version of the Coupled Coherent State method, specifically adapted for solving the time-dependent Schrödinger equation for multi-electron dynamics in atoms and molecules. This new theory takes explicit account of the exchange symmetry of fermion particles, and uses fermion molecular dynamics to propagate trajectories. As a demonstration, calculations in the He atom are performed using the full Hamiltonian and accurate experimental parameters. Single and double ionization yields by 160 fs and 780 nm laser pulses are calculated as a function of field intensity in the range 10^{14} - 10^{16} W/cm^2 and good agreement with experiments by Walker *et al.* is obtained. Since this method is trajectory based, mechanistic analysis of the dynamics is straightforward. We also calculate semiclassical momentum distributions for double ionization following 25 fs and 795 nm pulses at 1.5 10^{15} W/cm^2, in order to compare to the detailed experiments by Rudenko *et al.* For this more challenging task, full convergence is not achieved, but however major effects such as the finger-like structures in the momentum distribution are reproduced.

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Date submitted: 31 Jan 2012 Electronic form version 1.4