Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Electron Acceleration by a Tightly Focused Laser Pulse K.I. POPOV, University of Alberta, Edmonton, Alberta, Canada, V. YU. BYCHENKOV, P.N. Lebedev Physics Institute. Moscow, Russia, W. ROZMUS, R. SYDORA, University of Alberta, Edmonton, Alberta, Canada — By using the test particle approach we have studied electron vacuum acceleration including nonadiabatic effects and synchronized trajectories which correspond to particles experiencing constant phase of electromagnetic fields and subluminous phase velocity. After the averaging over the laser field phase, the energy and emission angle distributions versus the electron positions in the focal region have been obtained. The most effective acceleration was found for electrons placed at laser beam axes at the distance comparable to the Rayleigh length before the best focus position. The correlations between electron energies and the emission angles were studied. We also obtained the dependence of the maximum electron energy on the focal spot size. Results of test particle studies guided 3D particle-in-cell simulations with thin foil targets for the best conditions for electron acceleration in the Coulomb explosion regime.

Wojciech Rozmus
University of Alberta

Date submitted: 23 Jul 2007 Electronic form version 1.4