Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Dynamics of electron wave propagation in photoionization microscopy: Semiclassical open-orbit theory[1] LIBO ZHAO, JOHN DELOS, Department of Physics, College of William & Mary, Williamsburg, VA 23187, USA — Semiclassical open-orbit theory is used to describe the propagation of outgoing electron waves which are generated in photoionization of atoms in uniform strong electric fields. The spatial distributions of electron probability densities and current densities are predicted. The open-orbit theory, based on an assumption that electron waves propagate along classical paths from a point-like source to a detector, provides a clear and intuitive physical picture to interpret structures of observed geometrical interference patterns in photoionization microscopy. We calculated photoelectron ejection of hydrogen atoms in electric fields, and comparison is made with quantum-mechanical results. A strong quantum tunneling effect has been found. Such a tunneling effect should be visible in experiments.

[1]This work is supported by NSF.

Libo Zhao
Department of Physics, College of William & Mary,
Williamsburg, VA 23187, USA

Date submitted: 20 Jan 2010 Electronic form version 1.4