Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Study the orbital rotation of a trapped metal micro-particle driven by focusing circularly polarized beam YIQIONG ZHAO, Department of Physics & Electro-Optics Program, University of Dayton, DANIEL T. CHIU, Department of Chemistry, University of Washington, DAVID MCGLOIN, Electronic Engineering and Physics Division, University of Dundee, DAVID SHAPIRO, NSLS-II Project, Brookhaven National Laboratory — It is well know that matter can absorb the angular momentum (AM) transfer from photons and rotate around particular axis. Normally, spin rotation around sample's own axis is driven by absorbing spin AM of circularly polarized light, while absorbing orbital AM of light with spiral phase would drive orbital rotation around the beam axis. In this presentation, we study the orbital rotation which is particularly driven by focusing circularly polarized Gaussian beam. A micron-sized gold particle, which was trapped off-axis several microns below focus, was used as a micro-detector to absorb the orbital AM transferred from light and orbited around the beam axis. The experiments showed that the direction of orbital motion was in accordance with the handedness of the circular polarization. The orbiting dynamic of the trapped particle were quantitatively measured and discussed as a function of the laser power, numerical aperture of lens and particle size.

Yiqiong Zhao
Department of Physics & Electro-Optics Program, University of Dayton

Date submitted: 16 Nov 2009 Electronic form version 1.4