Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

**3D PIC Simulations of Particle Acceleration in Electromagnetic Cylinder and Torus**[1] KOICHI NOGUCHI, EDISON LIANG, Rice Univ. — Particle acceleration via Poynting vector with toroidal magnetic field is studied in 3D PIC simulation of electron-positron plasma. We choose two different initial magnetic field configurations to compare how the particle acceleration is affected by the expansion of electromagnetic wave. In the cylindrical case, the electromagnetic field strength decays as $(ct)^{-2}$, and particles are accelerated in the radial direction as well as the axial direction. Rayleigh-Taylor instability is also observed at the center of the cylinder. In the torus case, the field strength decays as $(ct)^{-3}$, making the acceleration less efficient. Particles accelerated in the axial direction by $E \times B$ force creates strong charge separation. We will discuss the relation between the model and the acceleration of particles in the magnetic tower jet from accretion disks, and the radiation profile from particles.

[1]This work is supported by LANL.

Koichi Noguchi
Rice Univ.

Date submitted: 24 Jul 2006 Electronic form version 1.4