Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Collimation of laser-induced high energy density electrons in imploded cylinder plasmas HIROTAKA NAKAMURA, Institute of Laser Engineering, Osaka University, RYOSUKE KODAMA, Graduate School of Engineering, Osaka University, YASUHIKO SENTOKU, Nevada Terawatt Facility, University of Nevada, TAKESHI MATSUOKA, TOSHINORI YABUUCHI, Institute of Laser Engineering, Osaka University, KAZUO TANAKA, Graduate School of Engineering, Osaka University, HIROYUKI SHIRAGA, Institute of Laser Engineering, Osaka University, PETER NORREYS, Plasma Physics Group, Central Laser Facility, Rutherford Appleton Laboratory — We have studied propagation of high energy density electrons in long dense plasmas interacted with ultra-intense laser light. The experiments have been carried out with implosion of a cone attached hollow cylinder target. Ultra-intense laser light with an energy of 120J and a pulse duration of 1ps has been injected into the cone target to heat the imploded cylindrical imploded dense plasmas with the energetic electrons generated at the cone tip. Heating of the imploded plasma has been proved with measurements of thermal neutrons to be 2×10^5 indicating efficient coupling of 15-20% of the laser energy. The results imply that collimation of the high energy density electrons in the cylindrical imploded plasma with a length of 300μm. PIC simulations also predict the collimation of the electrons in the long dense plasmas with a magnetic field induced by spatial gradient of resistivity due to the temperature gradient.

Hirotaka Nakamura
Institute of Laser Engineering, Osaka University

Date submitted: 31 Jul 2006 Electronic form version 1.4