

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Tight focusing of ultra-intense laser pulses by innovative plasma optics toward extreme intensity M. NAKATSUTSUMI, LULI, France, A. KON, Osaka U. JPN, J. FUCHS, S. BUFFECHOUX, P. AUDEBERT, LULI, R. KODAMA, Osaka U. — With rapid advances in laser technology, laser beams are now available that can be routinely focused to intensities approaching $>10^{21}$ Wcm $^{-2}$. Enhancement of laser intensity is achieved by truncating the pulse width, increasing the laser-energy, or reducing the focal spot size. Although the reduction of the spot size is the simplest among those, by using low f-number optics, this method is not frequently employed because of the difficulty in avoiding damage from target debris or complexity of alignment procedure. We developed for the first time very compact (<1 cm 3) extremely low f-number (0.4) plasma-based, confocal ellipsoid focusing systems. Direct measurement of the laser focal spot using low-energy laser indicates 1/5 reduction of spot size compared to standard focusing (using a f/3 optics). Around tenfold enhancement of laser intensity by reduction of the spot size for high power shots is clearly evidenced by remarkable enhancement of proton energy. The experiment was performed at LULI 100TW laser facility.

Motoaki Nakatsutsumi
LULI, France

Date submitted: 20 Jul 2009

Electronic form version 1.4