Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Anomalous Transmission of High Contrast Relativistically Intense Short Laser Pulses through Thin Metal Foils T. MATSUOKA, A. MAKSIMCHUK, T. LIN, CUOS U. of Michigan, O.V. BATISHCHEV, MIT., A.A BATISHCHEVA, Delta Search Labs., V. YU. BYCHENKOV, P. N. Lebedev Physics Institute, Russian Academy of Sciences — The frequency doubled laser pulses from the T^3 laser system at the Center for Ultrafast Optical Science of the University Michigan (with energy up to 1 J, a pulse duration of 400 fs, the wavelength is 0.53 μm and the maximum intensity is 10^{19} W/cm^2) has been used for the measurement of the light transmitted through thin metal targets. The intensity contrast ratio of the laser pulses was better than 10^{-9} which is low enough to suggest the interaction with solid density plasma. We observed the transmittance of the laser pulse through the aluminum foil with thickness up to 4 μm and found that this radiation is polarized and centered at 0.53 μm. We found that for 0.8 μm thick foils the transmission was anomalously high ($\sim 10^{-4}$) and can't be explained by the skin effect for relativistic pulse. The performed adaptive grid PIC simulations show good agreement between the calculated transmission coefficient and the experimental transmittance. Energetic electrons produced by the interaction are responsible for the anomalous transmission.

Takeshi Matsuoka
CUOS U. of Michigan

Date submitted: 25 Jul 2005 Electronic form version 1.4