Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Ion acceleration with a picosecond CO_2 laser[1] IGOR POGORELSKY, MARCUS BABZIEN, MIKHAIL POLYANSKIY, KARL KUSCHE, BNL, PETER SHKOLNIKOV, MICHAEL ISPIRIAN, SUNY Stony Brook, DAVID NEELY, Rutherford Appleton Lab., PAUL MCKENNA, DAVID CARROLL, Univ. of Strathclyde, NIZAR NAJMUDIN, JOERG SCHREIBER, CHARLOTTE PALMER, NICHOLAS DOVER, Imperial college, VITALY YAKIMENKO, BNL
— The ion acceleration experiment at BNL explores the laser wavelength scaling from optical to mid-IR region. 10^{16} W/cm^2 of a CO_2 laser intensity focused on a 8 μm Al foil produced a 1-MeV proton beam. This observation agrees with predicted scaling of the proton energy $E_p \sim I^{1/2}\lambda$. We now initiated new ion acceleration runs where a gas jet is a target. At the CO_2 laser wavelength (λ=10 μm), a critical plasma density is 100 times lower (10^{19} cm^{-3}) than for a glass laser. This opens new opportunities for time-resolved interferometric optical diagnostic of over-critical laser/plasma interactions. We present the latest results from both foil and gas jet ion acceleration experiments and give an outlook on possibilities of attaining multi-terawatt femtosecond pulses with CO_2 lasers.

[1]Supported by US DOE Grant.

Vitaly Yakimenko
BNL

Date submitted: 24 Aug 2009 Electronic form version 1.4