Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Online real time characterization of fast protons induced by a repetitive high-intensity laser-foil interaction A. YOGO, H. DAIDO, M. MORI, A. SAGISAKA, K. OGURA, S. ORIMO, H. KIRIYAMA, S. KANAZAWA, S. KONDO, Y. NAKAI, A. AKUTSU, M. TANOUE, Y. YAMAMOTO, T. SHIMOMURA, Advanced Photon Research Center, Japan Atomic Energy Agency, Japan, Y. OISHI, T. NAYUKI, T. FUJII, K. NEMOTO, Central Research Institute of Electric Power Industry, Japan, S. NAKAMURA, A. NODA, Y. IWASHITA, T. SHIRAI, Institute for Chemical Research, Kyoto University, Japan — We report the result on a novel online analysis of fast ions generated in an ultraintense laser-foil interaction. Fast protons are observed by a time-of-flight (TOF) detector, which is precisely calibrated using proton beams from an ion accelerator as to its detection efficiency depending on the proton energy. The TOF detector provides shot-to-shot energy distributions of protons immediately after the irradiation of a high-intensity laser pulse of $\sim 10^{18}$ W/cm^2. Definite correlations are found between the prepulse intensity and the high energy cutoff of protons as well as the conversion efficiency of the laser energy into the proton energy, governing the stability of the repetitive proton generation.

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Date submitted: 21 Jul 2006 Electronic form version 1.4