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Measurement of distribution of x-ray polarization degrees caused by anisotropic hot electrons in ultra-high intensity laser produced plasma
Y. INUBUSHI, Y. OKANO, H. NISHIMURA, T. KAI, S. FUJIOKA, Osaka Univ., T. KAWAMURA, Tokyo Tech., D. BATANI, A. MORACE, R. REDAELLI, Univ. Milan, C. FOURMENT, J. SANTOS, G. MALKA, Univ. Bordeaux 1, A. BOSCHERON, A. CASNER, CEA, M. KOENIG, LULI, T. NAKAMURA, T. JOHIZAKI, H. NAGATOMO, K. MIMA, Osaka Univ. — In fast-ignition, investigation of the velocity distribution function (VDF) of hot electrons is critical for clarifying energy transport in ultra-high intensity laser-produced plasmas. X-ray polarization spectroscopy is a useful diagnostic tool for measuring the VDF of electrons inside plasma [1, 2]. A new polarization measurement was performed using a laser pulse (10 J in ~ 1 ps). Chlorinated triple-layer targets were irradiated, and polarization degrees of Cl-He α line were measured. Obtained distribution of polarization degrees indicates that the VDF is pancake-like shape at the target surface and cigar-like in deep region. Moreover, depolarizations due to isotropic excitation by bulk electrons and elastic collision of bulk electrons, which were predicted by a model calculation [3] and a time-dependent atomic kinetic code [4], was observed. [1] J. C. Kieffer, et al., Phys. Rev. Lett. **68**, 480 (1992), [2] Y. Inubushi, et al., JQSRT **99**, 305 (2006). [3] Y. Inubushi, et al., J. Plasma Fusion Res. **2**, 0013 (2007). [4] T. Kawamura, et al., submitted.

Y. Inubushi
Osaka Univ.

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