Time-resolved two-color monochromatic x-ray imagers for fast-ignitor plasmas  

MINORU TANABE, TAKASHI FUJIWARA, SHINSUKE FUJIOKA, HIROAKI NISHIMURA, HIROYUKI SHIRAGA, HIROSHI AZECHI, KUNIOKI MIMA, Institute of Laser Engineering, Osaka University — Ultrafast two-dimensional (2D) x-ray imaging is required to investigate the dynamics of fast-heated core plasma in fast ignition research. A novel x-ray imager, consisting of two toroidally bent Bragg crystals and an ultrafast two-dimensional x-ray imaging camera, has been demonstrated in order to measure an electron temperature profile of fast-ignitor plasma. Sequential, two-color, and 2D monochromatic x-ray images of laser-imploded core plasma were obtained with a temporal resolution of 20 ps, a spatial resolution of 31 μm, and a spectral resolution of over 200, simultaneously. Details of the experimental results and analysis will be discussed.

1This work was performed under the auspices of the MEXT, under Grant-in-Aid for Scientific Research (B) “Advanced Diagnostics for Burning Plasma (code 442)” / “Temperature and density mapping of imploded burning plasma with monochromatic x-ray imaging.”

Minoru Tanabe  
Institute of Laser Engineering, Osaka University