Application of x-ray spectroscopy for WDM studies in relativistic laser plasma

Tatiana Pikuz
(Institute for Open and Transdisciplinary Research Initiatives,
Osaka University)

X-ray absorption spectroscopy is proposed as a method for studying the heating of solid-density matter excited by secondary X-ray radiation from a relativistic laser-produced plasma. The method was developed and applied to experiments involving thin silicon foils irradiated by 0.5–1.5 ps duration ultrahigh contrast laser pulses at intensities between 0.5×10^{20} and 2.5×10^{20} W/cm^2. The electron temperature of the material at the rear side of the target is estimated to be in the range of 140–300 eV. The diagnostic approach enables the study of warm densematter states with low self-emissivity. The capabilities of x-ray emission spectroscopy also will be discussed.