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Space-resolved Kα emission measurement of warm dense titanium targets irradiated by intense laser pulses[1] LEEJIN BAE, MINSANG CHO, GYEONGBO KANG, MINJU KIM, YOUNG HOON KIM, JONG-WON LEE, BYOUNG-ICK CHO, Gwangju Inst of Sci Tech, ULF ZASTRAU, European XFEL, Albert-Einstein-Ring — Measurements of characteristic inner-shell Kα emission have been widely used and reliable spectroscopic plasma diagnostics. Intense laser-plasma interactions on the solid target generate multiple electron distributions, i.e. hot relativistic and low energy bulk electrons. The bulk electrons create warm dense (10 ˜100 eV and solid density) conditions in titanium foil and induce the shifts of Kα emission spectra by creating M-shell vacancies. Therefore, modified Kα emission spectra can be served as a bulk electron temperature. In this contribution, we present the titanium Kα imaging spectroscopy experiment using a toroidally bent crystal, and the K-shell emission spectrum simulations using the collisional-radiative code SCFLY, for various bulk electron temperatures. The spatial distribution of electron temperature in the titanium foil which is irradiated by an intense laser pulse could be obtained, and possible electron transport mechanism will be discussed.

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Leejin Bae
Gwangju Inst of Sci
Tech

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