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Experimental and Computational Analysis of Photo-ionized Non-LTE Plasma Produced by Intense Laser[1]

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Two types of photo-ionized plasma experiments have been carried out with Gekko-XII laser in Osaka and Shingang-II laser in Shanghai as joint experiment with China. One is spectroscopic measurement of self emission from nitrogen plasma and the other is absorption by silicon plasma both heated by almost Planckian radiation with Tr = 80 eV in gold cavities heated by lasers. Experimental data are analyzed with two different codes developed in Japan and China. The code coupled with rate equation solver and HULLAC says that the nitrogen gas line emission can be explained when we assume the electron temperature is much lower than Tr and we obtained a good agreement with the electron temperature 20 eV. It is pointed out that this spectrum can be reproduced even if we assume the plasma and radiation is in LTE with Tr = Te = 60 eV. This suggests careful analysis is required in analyzing observational spectra from Universe.

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