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Experimental evidence and theoretical analysis of photoionized plasma under x-ray radiation produced by intense laser[1] FEILU WANG, National Astronomical Observatories, Chinese Academy of Sciences, SHINSUKE FUJIOKA, HIROAKI NISHIMURA, DAIJI KATO, YUTONG LI, GANG ZHAO, JIE ZHANG, HIDEAKI TAKABE — We composed a time-dependent detailed-configuration-accounting atomic model, which solves rate equations for level population distributions including collisional and radiative atomic processes based on the screened hydrogenic model (R. M. More, Handbook of Plasma Physics, vol. 3, Amsterdam: Elsevier Science Publishers, 1991). This model is used to interpret recent photoionization experiment on the large-scale laser system Gekko-XII (Yamanaka et al., 1981, IEEE, J. Quantum Electron. 17, 1639). In this experiment, the nitrogen gas was bathed in a Planckian radiation field of 80eV and was ionized beyond He-like state (open K-shell). It indicates the ionization parameter is around 10 erg cm/s under near steady-state conditions and the reasonable range of the electron temperature is 20-30eV. The comparison of synthetic and experimental spectra shows reasonable agreement and photoionization plays a significant role in this experiment.

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