

## X線による高温プラズマ診断のための木星イオプラズマトーラススペクトルモデルの開発

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### Spectral model of Io plasma torus for hot plasma diagnostic by X-rays

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X-ray emissions from Io plasma torus (IPT) were found by a spectrometer onboard Chandra X-ray observatory (CXO) (Elsner et al., 2002). Spectral measurements by CXO indicated one broad peak emission around photon energy of 570 eV on soft continuum. Spectral gradient of the continuum is consistent with electron thermal bremsstrahlung. Although emission process of the broad spectral peak is still unclear, Elsner et al. (2002) suggested that the broad peak is consisted of line emissions from highly charged oxygen ions via charge exchange process between high energy magnetospheric plasma with Iogenic neutrals. This study proposes a simple X-ray spectral model which consistently solves steady state chemical process of collisional plasma and successive radiative process in the IPT. Many astrophysical spectral models have long been developed involving only electron-ion collisions as collisional process. On the basis of these astrophysical plasma models, this study newly includes the neutral-ion collisional process supposing the charge exchange which is potentially essential for the IPT X-ray emissions. In our model, hot plasma with temperature of 100s eV emit OVII and OVIII lines at multiple excitation states around 570 eV photon energy. The charge exchange process makes the emission intensities of these ion lines more sensitive to the hot plasma temperature than the classical ion-electron collisional models. Based on this model, we propose a diagnostic method for hot plasma parameters at 100s eV in the IPT using spectral measurements. This method will be applied to interpretation of observations during Jovian X-ray campaign by CXO, XMM Newton, and Suzaku with SPRINT-A satellite in Apr 2014.