

## Observation of ion temperature and corotation deviation on Io plasma torus during an outburst in early 2015

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Atoms and molecules originated from volcanic eruption on Jovian satellite Io are ionized and form a donut-shaped region along Io's orbit which is called Io plasma torus. Although creation of pick-up ion in the plasma torus is expected to make high anisotropy ( $T_{\perp} > T_{\parallel}$ ) of ion temperature as well as deviation from corotation, the value of anisotropy and corotation deviation as well as their variability during an outburst from Io has not been clear yet. Tsuchiya et al.(2015) and Yoneda et al.(2015) have reported that the outburst from Io occurred during January through April 2015. Subsequent increase of EUV radiation from Io plasma torus was also observed by EUV space telescope, HISAKI.

We report the latest observation results of variability on the ion temperatures and the corotation deviation of Io plasma torus caused by the mass-loading during the outburst from Io in early 2015. The observation of sulfur ion emissions, [SII] 671.6nm and 673.1nm, was made at Haleakala Observatory in Hawaii during December 2014 during April 2015 including period of an outburst from Io. We employed a high-dispersion spectrograph ( $R = 67,000$ ) with an integral field unit (IFU) coupled to a 40-cm Schmidt-Cassegrain telescope. A high-dispersion spectroscopy with an imaging capability enables to derive line-of-sight velocity of ion which is associate with deviation from corotation, as well as its temperatures parallel and perpendicular to the magnetic field. The IFU consist of 132 optical fibers (core/crad/jacket diameter are 50/125/250 micro-meters, respectively). The fibers are arranged in 11 by 12 array at a telescope focus, and are lined up at an entrance slit of the spectrograph. This layout enables to make 2-dimentional spectroscopy over field-of-view of 55" by 61" with a spatial resolution of 5.1" on the sky. The IFU was developed in collaboration with the Institute for Astronomy, University of Hawaii.

Based on a preliminary result from the observation that produced more than 100 spectral datasets, there is an increase of ion temperature after the outburst from Io. Using an 1-dimensional time evolution model of Io plasma torus composition, the observed increase of ion temperature is expected to be associated with the mass-loading from Io. More accurate analysis including deviation of corotation after the outburst is ongoing, the result will also be presented at the meeting.