宇宙望遠鏡群を用いた多波長リモートセンシングによる国際木星観測キャンペーン

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The International Jupiter Campaign by multi-wavelength remote sensing using space telescope arrays

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Jupiter’s magnetosphere has one of the broadest hierarchic structures of plasma energy in the solar system bodies. The energy hierarchy spans from a few eV up to 50 MeV. Energy release, transport, and dissipation processes in Jupiter’s magnetosphere are responsible for heating of the bulk plasma and relativistic accelerations of energetic particles in the broad energy range. Energy for the magnetospheric dynamics are primarily provided from Jupiter’s fast rotation and internal plasma source, Io plasma torus (IPT). Thus Jupiter’s magnetosphere has classically been considered as a ’self-driven’ magnetosphere. However, some remote sensing of auroral and radio emissions (e.g., Tshuchiya et al., 2010) are suggestive of triggering and/or modifying of Jupiter’s magnetospheric activities as terrestrial magnetosphere. In this campaign, long-term activities of Jupiter’s aurora and IPT are monitored continuously with solar wind variations based on extreme ultraviolet imaging spectroscopy by SPRINT-A/EXCEED. EXCEED will measure precipitations of keV auroral electrons and heating of IPT from a few eV to 100s eV. This monitoring is planned as simultaneous observation with snapshots by Hubble Space Telescope (HST) in January 2014 and by Chandra X-ray Observatory (CXO), XMM Newton, and Suzaku in April 2014. Highly resolved auroral snapshots in far ultraviolet wavelength are taken per one day over 2 weeks by HST. These snapshots will capture auroral morphologies corresponding to specific locations of the magnetospheric energy release. High energy plasma from 100s eV to 50 MeV is directly captured by X-ray imaging and spectroscopy by CXO, XMM, and Suzaku. These X-ray observations can directly diagnose energetics of relativistic ion accelerations in polar aurora, plasma heating in IPT, ultra-relativistic electrons in the radiation belts. Based on these multi-wavelength remote sensing, we will uncover relations between Jupiter’s global energy process under the solar wind influence.