イオプラズマトーラスのエネルギー収支

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Energy budget in the IPT system: How does the IPT radiate intensively in the UV-EUV spectral region?

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One of the focal points of interest in the IPT system is the transport of energy and particles into the inner region. Delamere and Bagenal (2011) estimated the total energy budget of the IPT system, suggesting that hot electrons must be added to the system (See Figure 9 in their paper). Their estimate stated that UV radiation would reduce by 30-70% without the hot electrons in the system. To explain present brightness of the IPT, the IPT must be fueled up by 30-70%. Therefore, they explicitly assumed the existence of hot electrons in their calculation and found reasonable solutions regarding energy and mass budges in the IPT system, but this assumption has not been justified yet. Recently, we have taken the advantage of long-term and quasi-continuous simultaneous monitoring of the polar aurora and the Io Plasma Torus (IPT) located in the inner magnetosphere by Extreme Ultraviolet Spectroscope for Exospheric Dynamics/Hisaki. Studies on temporal characteristics over hours enabled us to see slow (˜10 h) coupling between the middle and inner magnetosphere as well as to quantify the temperature of hot electrons in the IPT. Furthermore, volcanic eruption in 2015 gave us opportunity to see how the IPT reacted to this event and how much energy was added to the system. We will discuss this classical issue, so-called Energy Crisis, by using Hisaki EUV spectrum.