## Future ultraviolet observation for monitoring Europa and outer planetary systems

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Ultraviolet observation technique is one of the most powerful tools to investigate space environments of outer planets. Japan's space telescope Hisaki performed long-term and continuous monitoring of lo plasma torus (IPT) in UV range. The temporal variation of IPT emissions observed by Hisaki showed Jupiter's magnetospheric dynamics and lo's volcanic activities. However, due to the low spatial resolution (17 arc-sec) and low sensitivity (effective area of 1-3 cm<sup>2</sup>), many science topics are not covered. For example, Hisaki cannot observe Jupiter's and Saturn's moons themselves because they are too small. The UV spectroscope onboard Hubble Space Telescope (HST) detected signatures of Europa' s water plume. However, due to the difficulty of long-term and continuous monitoring of Europa by HST, the frequency, periodicity, and driving processes of the plume are still open questions. It is also difficult for NASA' s Europa Clipper mission and ESA' s JUICE mission which will explore Jovian system in late 2020s to perform continuous monitoring due to their capabilities with Europa flyby observations. In order to achieve such observations, we are studying a concept of future ultraviolet spectroscopy mission. The preliminary design shows a Cassegrain telescope with 0.6-1-m primary mirror which can achieve an effective area of 100-200 cm2 and spatial resolution of 0.1-0.2 arc-sec. The baseline instruments are a spectrometer for 115-230 nm range and a wide field-of-view (~9 arc-min) imager. Here we present the overview of our mission concept, science targets, preliminary design of the ultraviolet telescope and instruments, and future plans.

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