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HST imaging of the Galilean moons Io and Ganymede and simultaneous Juno-UVS observations of the Io footprint

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The tenuous atmospheres of Jupiter's Galilean moons are key to understanding their interaction with the magnetosphere. The co-rotating magnetospheric plasma is locally perturbed at the moons and auroral emissions are generated in the moons' tenuous atmospheres. The perturbation generates Alfvén waves, which travel along Jupiter's field lines triggering various effects that finally lead to the auroral moon footprints far away in Jupiter's polar regions.

Within the large Hubble Space Telescope (HST) aurora program in support of the NASA Juno mission (HST GO-14634, PI D. Grodent), spectral images of the moons Io and Ganymede were obtained by HST's Space Telescope Imaging Spectrograph (STIS) on four occasions in 2017. In three cases, the Juno Ultraviolet Spectrograph (UVS) simultaneously observed Jupiter's polar aurora, aiming to measure the moon footprints. In this presentation, we compare the temporal variability of the local moon aurora and the footprint brightness for the case of Io. We investigate how the amplitude and phase of the periodically changing brightness of Io's aurora and the footprint are correlated. Additionally, we present the first spectral UV images of Ganymede transiting Jupiter. The Ganymede transit images are analyzed in the search for extinction by the moon's tenuous atmosphere and extended neutral cloud.