

Mapping the Brightness of Ganymede's UV Aurora using HST STIS Observations

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Abstract

Ganymede is the only known moon in the solar system with an intrinsic magnetic field and two auroral ovals around its magnetic north and south poles. In this work we analyse Hubble Space Telescope (HST) observations of Ganymede at OI 1356 Å to study the structure of its auroral ovals. Our aim is to combine HST observations from various epochs to generate a brightness map of Ganymede's two auroral ovals. Charged particles from Jupiter's magnetosphere can not excite the brightest emissions of 300 R only from the reported electron temperatures, but need to be accelerated due to magnetic reconnection happening between the magnetic field lines of Jupiter and Ganymede. The sub-alfvénic speed of the charged particles makes the Ganymede system different compared to the planets in the solar wind because no bow shock is formed, resulting in a more steady environment that is ideal to study the phenomenon. Our created map is intended to serve as a diagnostic tool helping to investigate magnetospheric current systems and reconnection that are responsible for the emissions and structure of the aurora.