

COS-GTO: Imaging of Mid-UV Emissions from Io in Eclipse

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Abstract

We will use one HST orbit to obtain the first images of Io's 2000-3000Å auroral emissions, using COS in NUV imaging mode. The atmosphere and corona of Jupiter's volcanic moon Io emits light at a wide variety of wavelengths, from FUV neutral O and S lines to SO emission at 1.7 microns. These emissions provide important constraints on the distribution and chemistry of Io's atmosphere, and Io's interaction with the Jovian magnetosphere. The neutral O and S FUV emissions, shortward of 2000Å, have been imaged extensively by HST/STIS and visible emissions (from neutral Na, K and O line emission, and SO₂ continuum emission) have been imaged by the Galileo, Cassini, and New Horizons spacecraft, but the spatial distribution of emissions in the 2000-3000Å region, thought to be dominated by SO₂ electron impact continuum emission, has not yet been determined. Earlier long-slit observations with STIS indicated strong concentration of 2800Å emission over the active volcano Prometheus (Jessup et al. 2004), suggesting local volcanic control, but Cassini images suggest that the SO₂ continuum seen at longer wavelengths is instead concentrated over the sub-Jovian and anti-Jovian points where there are magnetic connections between Io and the Jovian magnetosphere- the anti-Jovian point is close to Prometheus. A series of 200 second integrations (each with S/N ~100) taken in Jupiter eclipse should determine whether emission is concentrated over volcanos or over the sub-Jovian point, and should be able to observe motion of the emission due to changing magnetic field orientation if it is magnetically controlled. This observation will also provide experience in the use of COS in imaging mode.

Investigators:

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Number of investigators: 2

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Target Summary:

Target	RA	Dec	Magnitude
IO			V = 5.5 +/- 1.0, F(2900) = 50 kR

Observing Summary:

Target	Config Mode and Spectral Elements	Flags	Orbits
IO	COS/NUV Imaging MIRRORA		1

Total prime orbits: 1

This is a COS GTO project, no scientific justification is needed.