



11649 - Elucidating the mystery of the Io footprint time variations

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

<i>Visit</i>	<i>Targets used in Visit</i>	<i>Configurations used in Visit</i>	<i>Orbits Used</i>	<i>Last Orbit Planner Run</i>	<i>OP Current with Visit?</i>
01	(1) JUPITER-SOUTH-1	STIS/FUV-MAMA	1	18-Aug-2009 21:14:51.0	yes
02	(2) JUPITER-SOUTH-2	STIS/FUV-MAMA	1	18-Aug-2009 21:14:57.0	yes
03	(3) JUPITER-SOUTH-3	STIS/FUV-MAMA	1	18-Aug-2009 21:15:01.0	yes

3 Total Orbits Used

ABSTRACT

The Io UV footprint (IFP) is an auroral emission on Jupiter consisting of one or more spots resulting from the electromagnetic interaction between Io and the Jovian magnetosphere. Recent UV HST observations of the Jovian aurora raised new issues and put previous interpretations under question.

Dedicated STIS Time-tag observations based on only 3 HST orbits will help us to directly answer the following questions and test new hypothesis on the physics driving their associated phenomenon.

The proposed observations will determine whether the previously observed short timescale (~ 2 min) variations of the IFP are periodic or burst events. If the (quasi-)periodicity is established, these constraints will help us to understand the origin of these variations. These observations will also clarify the conditions of occurrence of the unexpected quasi-simultaneous variations of the southern multiple spots of the IFP. Moreover, we propose to observe the emergence of the southern leading (or precursor) spot and the possible evolution of its brightness. These two elements might validate or exclude the recently proposed idea that cross-hemisphere electron beams or strong non-linearities of the electromagnetic interaction explain the presence of the leading and secondary spots.

OBSERVING DESCRIPTION

This program consists of 3 STIS FUV-MAMA timetag sequences dedicated to the study of the variability of the Io auroral footprint (IFP) on Jupiter's southern hemisphere. In order to avoid buffer overflows, only a restricted part of the planetary disk (i.e. 35-45%) should appear on the image. Since the size of the planetary disk is related to the HST-Jupiter distance, the precise offset will require small corrections depending on the observation date. Moreover, offsets leading to Io footprint features hidden by the repeller wire shadow should also be avoided. Consequently, the final pointing offset will be determined with the Contact Scientist or the Program Coordinator once the HST orbit dates are known with sufficient accuracy.

Proposal 11649 - Visit 01 - Elucidating the mystery of the Io footprint time variations

Visit	Proposal 11649, Visit 01, implementation							Wed Aug 19 01:15:11 GMT 2009		
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/FUV-MAMA									
	Special Requirements: ORIENT 60D TO 68 D; BETWEEN 11-SEP-2009:00:00:00 AND 12-SEP-2009:00:00:00									
Comments: Target defintions are time-specific. BETWEEN can be changed if necessary, but the target definitions would need to be changed to match.										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(1)	JUPITER-SOUTH-1	STD=JUPITER	TYPE=POS_ANGLE,RAD=23,ANG=158,REF=NORTH		OLG OF IO BETWEEN 130 200, CML OF JUPITER FROM IO BETWEEN 90 120	EARTH			
	Comments: This target is for observations of UV emissions from Jupiter's south polar region. The offset position is such that the south polar quadrant of Jupiter lies in the 25x25 arc sec STIS FUV MAMA field of view. The area of the planet disc in the FOV is limited to 35-45% so that the total counting rate due to reflected sunlight is less than 20,000 c/s. Moreover, one should avoid placing the Io footprint features just under the repeller wire shadow. We will need to interact with the CS/PS to set the appropriate pointing offset once potential observing dates have been released.									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(1) JUPITER-SOUT H-1	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99.0	GS ACQ SCENARI O BASE1B3		2688 Secs [==>]	[1]
Orbit Structure	Orbit 1									
	Moving Target Tracking									
GS Acq Setup Exp. 1 Unured Viribility = 40 Occultation Home <										

Proposal 11649 - Visit 02 - Elucidating the mystery of the Io footprint time variations

Visit	Proposal 11649, Visit 02, implementation							Wed Aug 19 01:15:11 GMT 2009		
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: STIS/FUV-MAMA									
	Special Requirements: BETWEEN 31-AUG-2009:00:00:00 AND 01-SEP-2009:00:00:00									
Comments: Target defintions are time-specific. BETWEEN can be changed if necessary, but the target definitions would need to be changed to match.										
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center			
	(2)	JUPITER-SOUTH-2	STD=JUPITER	TYPE=POS_ANGLE,RAD=23,ANG=175,REF=NORTH		OLG OF IO BETWEEN 110 185, CML OF JUPITER FROM IO BETWEEN 140 175	EARTH			
	Comments: This target is for observations of UV emissions from Jupiter's south polar region. The offset position is such that the south polar quadrant of Jupiter lies in the 25x25 arc sec STIS FUV MAMA field of view. The area of the planet disc in the FOV is limited to 35-45% so that the total counting rate due to reflected sunlight is less than 20,000 c/s. Moreover, one should avoid placing the Io footprint features just under the repeller wire shadow. We will need to interact with the CS/PS to set the appropriate pointing offset once potential observing dates have been released.									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1		(2) JUPITER-SOUT H-2	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99.0			2728.0 Secs [==>]	[1]
Orbit Structure	Orbit 1 Server Version: 20090702 GS Acq Setup Moving Target Tracking Exp. 1 Occultation Unused Visibility = 0 Home									

Visit	Proposal 11649, Visit 03, implementation										Wed Aug 19 01:15:12 GMT 2009	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: STIS/FUV-MAMA											
	Special Requirements: ORIENT 68D TO 69 D; BETWEEN 31-AUG-2009:00:00:00 AND 01-SEP-2009:00:00:00											
Comments: Tarqet definitions are time-specific. BETWEEN can be changed if necessary, but the tarqet definitions would need to be changed to match.												
Solar System Targets	#	Name	Level 1	Level 2	Level 3	Window	Ephem Center					
	(3)	JUPITER-SOUTH-3	STD=JUPITER	TYPE=POS_ANGLE,RAD=23,ANG=175,REF=NORTH		OLG OF IO BETWEEN 115 185, CML OF JUPITER FROM IO BETWEEN 175 215	EARTH					
	Comments: This target is for observations of UV emissions from Jupiter's south polar region. The offset position is such that the south polar quadrant of Jupiter lies in the 25x25 arc sec STIS FUV MAMA field of view. The area of the planet disc in the FOV is limited to 35-45% so that the total counting rate due to reflected sunlight is less than 20,000 c/s. Moreover, one should avoid placing the Io footprint features just under the repeller wire shadow. We will need to interact with the CS/PS to set the appropriate pointing offset once potential observing dates have been released.											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit		
	1		(3) JUPITER-SOUT H-3	STIS/FUV-MAMA, TIME-TAG, F25SRF2	MIRROR	BUFFER-TIME=99.0			2728.0 Secs			
									[==>]	[1]		
Orbit Structure	Orbit 1											Server Version: 20090702
	GS Acq Setup Exp. 1 Moving Target Tracking Unused Virability = 0 Occultation Home </											