10507 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Cycle: 14, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets*	*Configurations*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) JUPITER1	ACS/SBC	1	20-Dec-2005 21:00:45.0	yes
02	(2) JUPITER2	ACS/SBC	1	20-Dec-2005 21:00:52.0	yes
03	(3) JUPITER3	ACS/SBC	1	20-Dec-2005 21:00:58.0	yes
04	(4) JUPITER4	ACS/SBC	1	20-Dec-2005 21:01:03.0	yes

4 Total Orbits Used

ABSTRACT

The analysis of HST-STIS FUV images has greatly and quickly advanced our knowledge of the magnetospheric mechanisms producing the auroral emissions on the giant planets. However, these studies were limited to the brightest emissions and very little has been said about the fainter emissions, mainly because of the lower S/N. We propose to image the faint auroral emissions on Jupiter which could not be observed with STIS. We will take full advantage of ACS/SBC's higher sensitivity to observe the diffuse auroral FUV emissions appearing poleward and directly equatorward of Jupiter's main auroral oval in the northern hemisphere. This proposal has the potential to reveal new magnetosphere-ionosphere coupling mechanisms especially those involving solar wind interactions with a giant planet.

OBSERVING DESCRIPTION

We will take full advantage of ACS's higher sensitivity to observe the diffuse auroral FUV emissions appearing poleward and directly equatorward of Jupiter's main auroral oval in the northern hemisphere (Figure 3). Recent ACS/SBC imaging of Jupiter's aurora (GO-10140) demonstrates that the global count rate is well below the bright object limit. It also shows that sufficient S/N is reached with exposure times on the order of 100s. Past STIS observations demonstrate that the polar emissions (especially the diffuse swirl region) are best viewed when the central meridian longitude (CML) is close to 180? (S3). The present program consists of 4 independent HST orbits. They could be arranged in a way such that in each orbit, the auroral footprint of Io appears in a different sector, spanning approximately 45? of longitude. This footprint and its trailing tail may then be used as aids to map the equatorial boundary of the diffuse emission in different local time sectors. The 4 orbits should ideally be executed near Jupiter's opposition (6 May 2006), preferentially during the three-month period prior to opposition or during the second half of May, during which two-gyro observations are possible.

ADDITIONAL COMMENTS

Four targets were defined (one for each visit/orbit). They are all the same, the purpose of this redundancy is to ensure that the 4 orbits can be scheduled completely independently.

The timing and geometric constraints may be adjusted in order to increase the schedulability.

Proposal 10507 - Visit 01 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Visit

Proposal 10507, Visit 01 Wed Dec 21 02:01:06 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: SCHED 100%; BETWEEN 07-FEB-2006:00:00:00 AND 08-FEB-2006:00:00:00

Comments: The 4 orbits should ideally be executed near Jupiter?s opposition (6 May 2006), preferentially between 15 Feb 2006 and 31 May 2006, during which two-gyro observations are possible.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(1)	JUPITER1	STD=JUPITER	TYPE=POS_ANGLE,RAD=20.0,ANG=25.0,REF=NORTH		CML OF JUPITER FROM EARTH BETWEEN 120.0 200.0

Comments: Celestial North up (Jupiter North up) in ACS FOV.
Final POS_ANGLE values may depend upon NOMINAL ORIENTATION

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) JUPITER1	ACS/SBC, ACCUM, SBC	F125LP				105.0 Secs X 17	
								[==>(Copy 1)]	
								[==>(Copy 2)]	
								[==>(Copy 3)]	
								[==>(Copy 4)]	
								[==>(Copy 5)]	
								[==>(Copy 6)]	
								[==>(Copy 7)]	
								[==>(Copy 8)]	
								[==>(Copy 9)]	***[1]***
								[==>(Copy 10)]	
								[==>(Copy 11)]	
								[==>(Copy 12)]	
								[==>(Copy 13)]	
								[==>(Copy 14)]	
								[==>(Copy 15)]	
								[==>(Copy 16)]	
								[==>(Copy 17)]	

Proposal 10507 - Visit 01 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Proposal 10507 - Visit 02 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Visit

Proposal 10507, Visit 02 Wed Dec 21 02:01:07 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: SCHED 100%; BETWEEN 07-FEB-2006:12:00:00 AND 29-MAY-2006:23:59:59

Comments: The 4 orbits should ideally be executed near Jupiter?s opposition (6 May 2006), preferentially during the three-month period prior to opposition or during the second half of May, during which two-gyro observations are possible.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(2)	JUPITER2	STD=JUPITER	TYPE=POS_ANGLE,RAD=20.0,ANG=25.0,REF=NORTH		CML OF JUPITER FROM EARTH BETWEEN 150.0 200.0, OLG OF IO BETWEEN 100.0 200.0

Comments: Celestial North up (Jupiter North up) in ACS FOV

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(2) JUPITER2	ACS/SBC, ACCUM, SBC	F125LP				105.0 Secs X 18	
								[==>(Copy 1)]	***[1]***
								[==>(Copy 2)]	
								[==>(Copy 3)]	
								[==>(Copy 4)]	
								[==>(Copy 5)]	
								[==>(Copy 6)]	
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								[==>(Copy 10)]	
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								[==>(Copy 15)]	
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								[==>(Copy 17)]	
								[==>(Copy 18)]	

Proposal 10507 - Visit 02 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Proposal 10507 - Visit 03 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Visit

Proposal 10507, Visit 03 Wed Dec 21 02:01:08 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: SCHED 100%; BETWEEN 07-FEB-2006:12:00:00 AND 29-MAY-2006:23:59:59

Comments: The 4 orbits should ideally be executed near Jupiter?s opposition (6 May 2006), preferentially during the three-month period prior to opposition or during the second half of May, during which two-gyro observations are possible.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(3)	JUPITER3	STD=JUPITER	TYPE=POS_ANGLE,RAD=20.0,ANG=25.0,REF=NORTH		CML OF JUPITER FROM EARTH BETWEEN 150.0 200.0, OLG OF IO BETWEEN 100.0 200.0

Comments: Celestial North up (Jupiter North up) in ACS FOV

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(3) JUPITER3	ACS/SBC, ACCUM, SBC	F125LP				105.0 Secs X 18	
								[==>(Copy 1)]	***[1]***
								[==>(Copy 2)]	
								[==>(Copy 3)]	
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Proposal 10507 - Visit 03 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Proposal 10507 - Visit 04 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.

Visit

Proposal 10507, Visit 04 Wed Dec 21 02:01:08 GMT 2005

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/SBC

Special Requirements: SCHED 100%; BETWEEN 07-FEB-2006:12:00:00 AND 29-MAY-2006:23:59:59

Comments: The 4 orbits should ideally be executed near Jupiter?s opposition (6 May 2006), preferentially during the three-month period prior to opposition or during the second half of May, during which two-gyro observations are possible.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window
(4)	JUPITER4	STD=JUPITER	TYPE=POS_ANGLE,RAD=20.0,ANG=25.0,REF=NORTH		CML OF JUPITER FROM EARTH BETWEEN 150.0 200.0, OLG OF IO BETWEEN 100.0 200.0

Comments: Celestial North up (Jupiter North up) in ACS FOV

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(4) JUPITER4	ACS/SBC, ACCUM, SBC	F125LP				105.0 Secs X 18	
								[==>(Copy 1)]	***[1]***
								[==>(Copy 2)]	
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								[==>(Copy 4)]	
								[==>(Copy 5)]	
								[==>(Copy 6)]	
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								[==>(Copy 8)]	
								[==>(Copy 9)]	
								[==>(Copy 10)]	
								[==>(Copy 11)]	
								[==>(Copy 12)]	
								[==>(Copy 13)]	
								[==>(Copy 14)]	
								[==>(Copy 15)]	
								[==>(Copy 16)]	
								[==>(Copy 17)]	
								[==>(Copy 18)]	

Proposal 10507 - Visit 04 - High resolution imaging of Jupiter's diffuse auroral emissions inside and outside the main oval during solar minimum.