12239 - Springtime at Uranus: Upheaval in the Stratosphere?

Cycle: 18, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	*Institution*	*E-Mail*
Dr. Gilda E. Ballester (PI)	**University of Arizona**	**gilda@vega.lpl.arizona.edu**

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) URANUS	STIS/FUV-MAMA	1	22-Sep-2010 23:00:00.0	yes
02	(1) URANUS	STIS/FUV-MAMA	1	22-Sep-2010 23:00:07.0	yes

2 Total Orbits Used

ABSTRACT

The upper atmosphere (stratosphere and thermosphere) of Uranus is highly anomalous among the giant planets, for reasons that are poorly understood. One likely factor is Uranus' uniquely large obliquity and low internal heat source, so that during its year, localized atmospheric heating varies drastically. Thus, to understand the influence of this seasonal variation on upper atmospheric dynamics, observations made over at least one Uranian solstice-to-equinox season are key.

The most comprehensive observations of Uranus were made in 1986 by Voyager 2 during its flyby, which occurred when the planetary spin axis pointed nearly at the sun (i.e., extreme solstice), nearly suppressing local diurnal variation of insolation. At present, Uranus has

just passed equinox, so that local diurnal insolation variation is nearly 100%, and so re-observing Uranus' upper atmosphere now would comprise the ideal comparison for understanding its seasonal dynamics. Therefore, two orbits of HST/STIS FUVMAMA/G140L time-tagged spectral images of the sunlit disk of Uranus will provide spatially resolved spectra of its airglow in the 1300-1650 A region. By comparing these spectra with those from 1986, we will determine the influence of seasonality on Uranus' upper atmospheric dynamics. Comparison with Uranus STIS data from 1998 is also key.

[The original PI of this program was Dr. Floyd Herbert.]

OBSERVING DESCRIPTION

Two HST orbits will be used to take long STIS FUVMAMA time-tagged exposures of Uranus doing slitless spectroscopy with the G140L grating and the 25MAMA aperture to fully image Uranus' 3.7 arcsec disk at Lyman-alpha and reflected FUV continuum. A POS TARG of +1 arcsec in AXIS1 will move Uranus Lyman-alpha disk image away from the short-wavelength edge of the detector. A POS TARG of +2 arcsec in AXIS2 will move Uranus' signal away from the repeller wire shadow. (No target acquisitions are needed for this slitless spectroscopy as done in 1998 GO#7349 visits 3 & 4.)

This high-ranking program relies on observing at low geocorona because the OI 1304 A and Lyman-alpha backgrounds will fill the 25MAMA aperture and overlap Uranus' signal. The program should thus be executed within 20 days to at most a month from opposition so that most of the dwell time is in shadow. Uranus' 21-Sep-2010 opposition allows for 40-50 days for scheduling within Cycle 18. For easy scheduling, the 2 awarded orbits have been split into 2 visits that do not need to be executed consecutively.

The exposures will be far from bright object limits. The 25"x25" f-o-v around Uranus (a moving target) within +/-1 month from opposition has some dim objects at times.

Proposal 12239 - Visit 01 - Springtime at Uranus: Upheaval in the Stratosphere?

Visit

Proposal 12239, Visit 01, scheduling Thu Sep 23 03:00:12 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: (none)

Comments: This program requires observing Uranus (a weak FUV source) the closest possible to opposition - within about 20 days to at most a month - to minimize the geocoronal background.

Solar System Targets

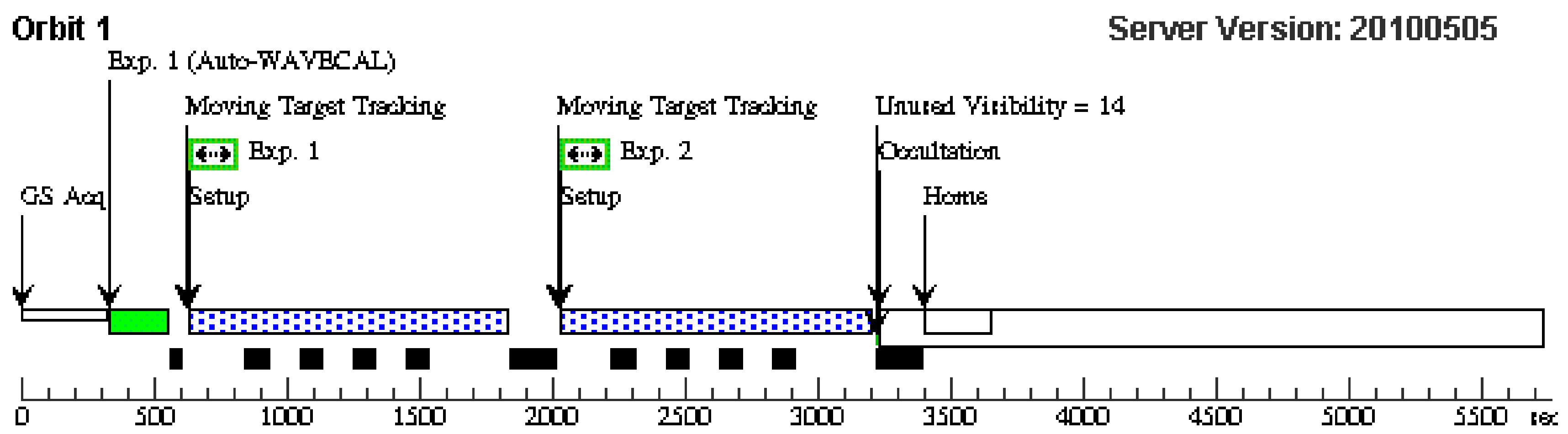
#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS			OLG OF URANUS BETWEEN 330 30	EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	G140L 1425 A	BUFFER-TIME=200	POS TARG 1.0,2.0		1160 Secs *[==>]*	*[1]*
2		(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	G140L 1425 A	BUFFER-TIME=200	SAME POS AS 1		1160 Secs *[==>]*	*[1]*

Comments: Expand exposure time if possible.

Orbit Structure



Proposal 12239 - Visit 02 - Springtime at Uranus: Upheaval in the Stratosphere?

Visit

Proposal 12239, Visit 02, scheduling

Thu Sep 23 03:00:14 GMT 2010

Diagnostic Status: No Diagnostics

Scientific Instruments: STIS/FUV-MAMA

Special Requirements: (none)

Comments: This program requires observing Uranus (a weak FUV source) the closest possible to opposition - within about 20 days to at most a month - to minimize the geocoronal background.

Solar System Targets

#	Name	Level 1	Level 2	Level 3	Window	Ephem Center
(1)	URANUS	STD=URANUS			OLG OF URANUS BETWEEN 330 30	EARTH

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	G140L 1425 A	BUFFER-TIME=200	POS TARG 1.0,2.0		1160 Secs *[==>]*	*[1]*
2		(1) URANUS	STIS/FUV-MAMA, TIME-TAG, 25MAMA	G140L 1425 A	BUFFER-TIME=200	SAME POS AS 1		1160 Secs *[==>]*	*[1]*

Comments: Expand exposure time if possible.

Orbit Structure