



13628 - Lyman-alpha observations of the interplanetary hydrogen: support of a NASA sounding rocket program and study of the local interstellar medium

Cycle: 21, Proposal Category: GO/DD

(Availability Mode: AVAILABLE)

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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) UPWIND-INTERPLANETARY-HYDROGEN	STIS/FUV-MAMA	1	11-Mar-2014 21:12:16.0	yes

1 Total Orbits Used

ABSTRACT

Our proposal is to use the Hubble Space Telescope Imaging Spectrograph (HST /STIS) over a single orbit to make Lyman-alpha observations of the interplanetary hydrogen (IPH) during the April period of this year (2014).

These measurements will provide wavelength and flux calibration, in order to support the HYPE instrument (Hydrogen Polarimetric Explorer) that is planned to make spectro-polarimetric observations in April during a suborbital flight of a NASA sounding rocket (grant NNX08AI98G). Cross-calibration will also be made with the SWAN instrument (Solar Wind Anisotropies) on the SOHO satellite (Solar and Heliospheric Observatory). SWAN can provide flux calibration but without any spectral information, so only HST/STIS can provide the wavelength calibration.

Moreover the scientific controversy on the physical properties of the local interstellar medium (LISM) is still going on. The recent observations of interstellar helium atoms by IBEX (Interstellar Boundaries Explorer) suggest that the LISM velocity vector may vary over time. Such a change should impact the bulk velocity of interplanetary hydrogen and should be detected by HST /STIS.

OBSERVING DESCRIPTION

TARGET & OBSERVATION MODE

We will observe the backscattering of solar Lyman-alpha photons by the interplanetary hydrogen (IPH) in the upwind direction with HST/STIS during one orbit, in order to obtain one high-resolution line profile. The IPH is a faint and diffuse source, this is why we will use the E40H echelle grating with the long slit (52" x 0.5") in order to increase the signal-to-noise ratio. We already used this available but not supported mode for previous observations (2001, 2012, 2013).

SCHEDULING CONSTRAINTS

We desire to obtain the maximum Doppler shift between the interplanetary and geocoronal emissions in order to reduce the overlapping between line profiles. This requires that the Earth moves toward the upwind direction, so the observation should occur in a window of 2 months centred around 1st April 2013. April will suit better than March, because of a unique opportunity of cross-calibration: the HYPE instrument (Hydrogen Polarimetric Explorer) is planned to make spectro-polarimetric observations in April during a suborbital flight of a NASA sounding rocket (grant NNX08AI98G).

CONSTRAINT ON THE FIELD OF VIEW

The observations should be done with no stars brighter than V-Magnitude=18 in the aperture.

REQUEST ON THE FUV-MAMA DETECTORS

With a signal-to-noise of about 10, the background noise is a significant issue for the data analysis. This is why it is really important and necessary to start the FUV-MAMA detectors just before the exposure, in order to reduce the background noise, especially the intermittent glow due to the dark current. (http://www.stsci.edu/hst/stis/documents/handbooks/currentIHB/c07_performance6.html#310668)

Visit	Proposal 13628, Visit 01
	Diagnostic Status: Warning
	Scientific Instruments: STIS/FUV-MAMA
	Special Requirements: BETWEEN 28-MAR-2014:00:00:00 AND 30-APR-2014:00:00:00

Comments: Lyman-alpha observations of the interplanetary hydrogen in the upwind direction.

Diagnostics	(Visit 01) Warning (Form): A target acquisition should probably be performed before doing spectroscopy or coronagraphy with STIS or COS.
	(Exposure 1 (Visit 01)) Warning (Form): Sensitive exposures should have an ETC run number provided.

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	UPWIND-INTERPLANETARY-HYDROGEN	RA: 16 50 46.7511 (252.6947962d) Dec: -15 25 42.35 (-15.42843d) Equinox: J2000		V=22 Lyman-alpha emission from the geocorona = 6.1e-13 erg/s/cm2/arcsec2	Reference Frame: ICRS
	<i>Comments: The observations should be done with no stars brighter than V-Magnitude=18 in the aperture.</i>					

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) UPWIND-INTERPLANETARY-HYDROGEN	STIS/FUV-MAMA, TIME-TAG, 52X0.5	E140H 1234 A	BUFFER-TIME=40 00			2400 Secs (2524 Secs) [=>2524.0 Secs]	[1]
	<i>Comments: ETC can not be run because we are using an unsupported mode: E140H grating with the 52" x 0.5" slit.</i>									

