



12221 - The role of photoevaporation in clearing protoplanetary disks: mapping flows and determining mass flow rates

Cycle: 18, 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) V-TW-HYA	STIS/CCD	1	07-Jul-2010 22:08:48.0	yes
02	(1) V-TW-HYA	STIS/CCD	1	07-Jul-2010 22:08:53.0	yes
03	(2) V-T-CHA	STIS/CCD	1	07-Jul-2010 22:08:57.0	yes
04	(2) V-T-CHA	STIS/CCD	1	07-Jul-2010 22:09:01.0	yes

4 Total Orbits Used

ABSTRACT

The lifetime of an isolated protoplanetary disk is thought to be set by the combination of viscous accretion and photoevaporation driven by high-energy photons from the central star. While diagnostics of accretion are numerous and mass accretion rates are routinely measured, diagnostics of centrally driven disk photoevaporation are just emerging. The [OI] 6300 angstrom is expected to trace slow disk winds extending out to 30-40 AU

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from the central star if driven by stellar Xrays. We propose to use this line diagnostic to measure for the first time the radial extent of the photoevaporative flow and the disk photoevaporation rate. Our targets are two nearby T Tauri disks with dust depleted inner regions, low stellar accretion rates, and ancillary evidence for on-going photoevaporation. Slitless spectroscopy with STIS will enable us to map these flows at a spatial resolution of ~ 6 AU. From their extension we will determine whether stellar EUV or Xrays drive most of the photoevaporation, provide the first measurements of mass flow rates, and thus constrain expected disk lifetimes.

OBSERVING DESCRIPTION

We will perform slitless spectroscopy of two nearby protoplanetary disks around TW Hya and T Cha using the G750M/6252 setting with STIS. Our goal is to spatially resolve the [OI] 6300AA emission from these disks and thus constrain disk photoevaporation models. The [OI] 6300AA line is the brightest emission line in the 5966–6538AA wavelength range covered by the G750M/6252 setting, followed by the [OI] 6364AA (about a factor of 2 weaker). The two lines will be well separated and kinematically unresolved from both targets, which will make it easier to interpret the emission line images. We do not expect to spatially resolve any other emission line from these two disks.

For target acquisition we will use the recommended longpass F28X50LP filter and 1sec exposure.

For each target we will have two position angles (as much as possible perpendicular to each other) to accurately remove the stellar spectrum.

REAL TIME JUSTIFICATION

1 orbit per target times 2 position angles per target times 2 targets = 4 orbits. We estimated that in 1 orbit (about 40min on-source exposure) we will reach a S/N of over 100 per resolution element.

CALIBRATION JUSTIFICATION

We do not require any special calibration

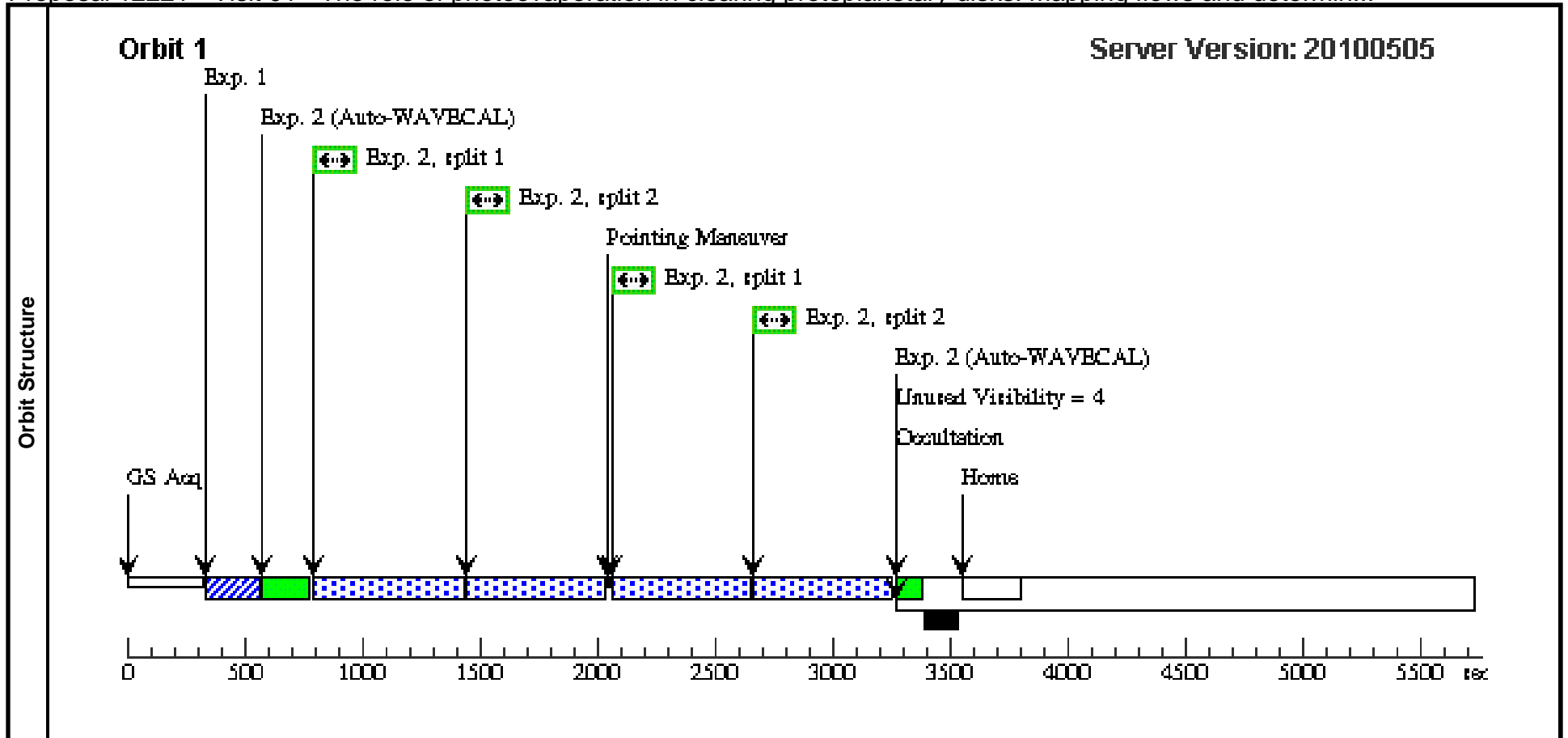
ADDITIONAL COMMENTS

We request that the HST observations for each star (2 orbits) be executed consecutively.

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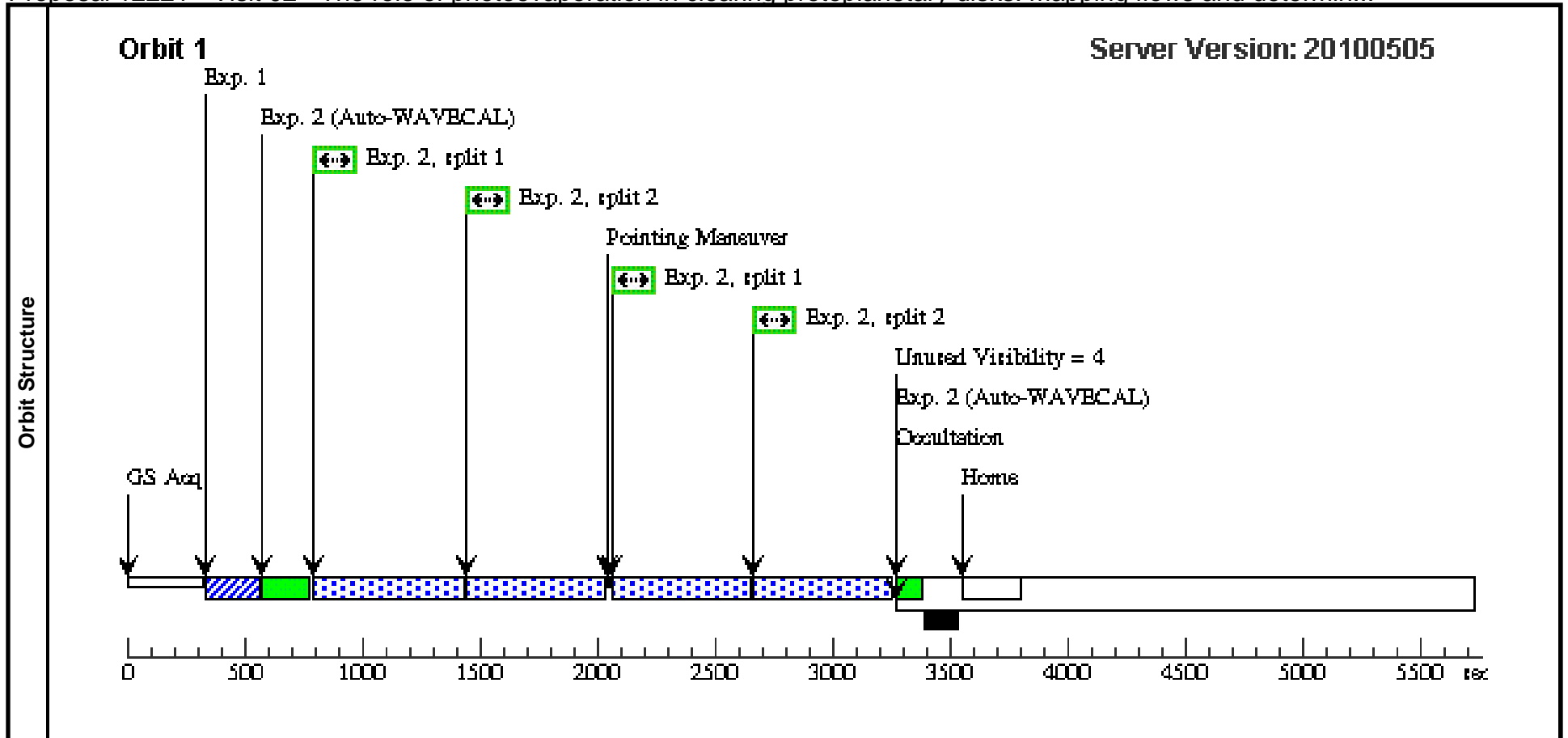
Visit	Proposal 12221, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: (none)									
	Patterns	#	Primary Pattern				Secondary Pattern			
(1)		Pattern Type=STIS-ALONG-SLIT Purpose=DITHER Number Of Points=2 Point Spacing=0.2789 Line Spacing=		Coordinate Frame=POS-TARG Pattern Orientation=90.0 Angle Between Sides= Center Pattern=false						(2)
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes	Miscellaneous			
	(1)	V-TW-HYA	RA: 11 01 51.9063 (165.4662763d) Dec: -34 42 17.02 (-34.70473d) Equinox: J2000			V=11.07	Reference Frame: ICRS			
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Coordinates are from Hipparcos</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) V-TW-HYA		STIS/CCD, ACQ, F28X50LP	MIRROR				0.5 Secs	
									[==>]	[1]
	2	(1) V-TW-HYA		STIS/CCD, ACCUM, 50CCD	G750M 6252 A			Pattern 1, Exps 2-2 (1)	1000. Secs [==>555.0 Secs (Pattern 1, Split 1)] [==>555.0 Secs (Pattern 1, Split 2)] [==>555.0 Secs (Pattern 2, Split 1)] [==>555.0 Secs (Pattern 2, Split 2)]	[1]



Proposal 12221 - Visit 01 - The role of photoevaporation in clearing protoplanetary disks: mapping flows and determin...

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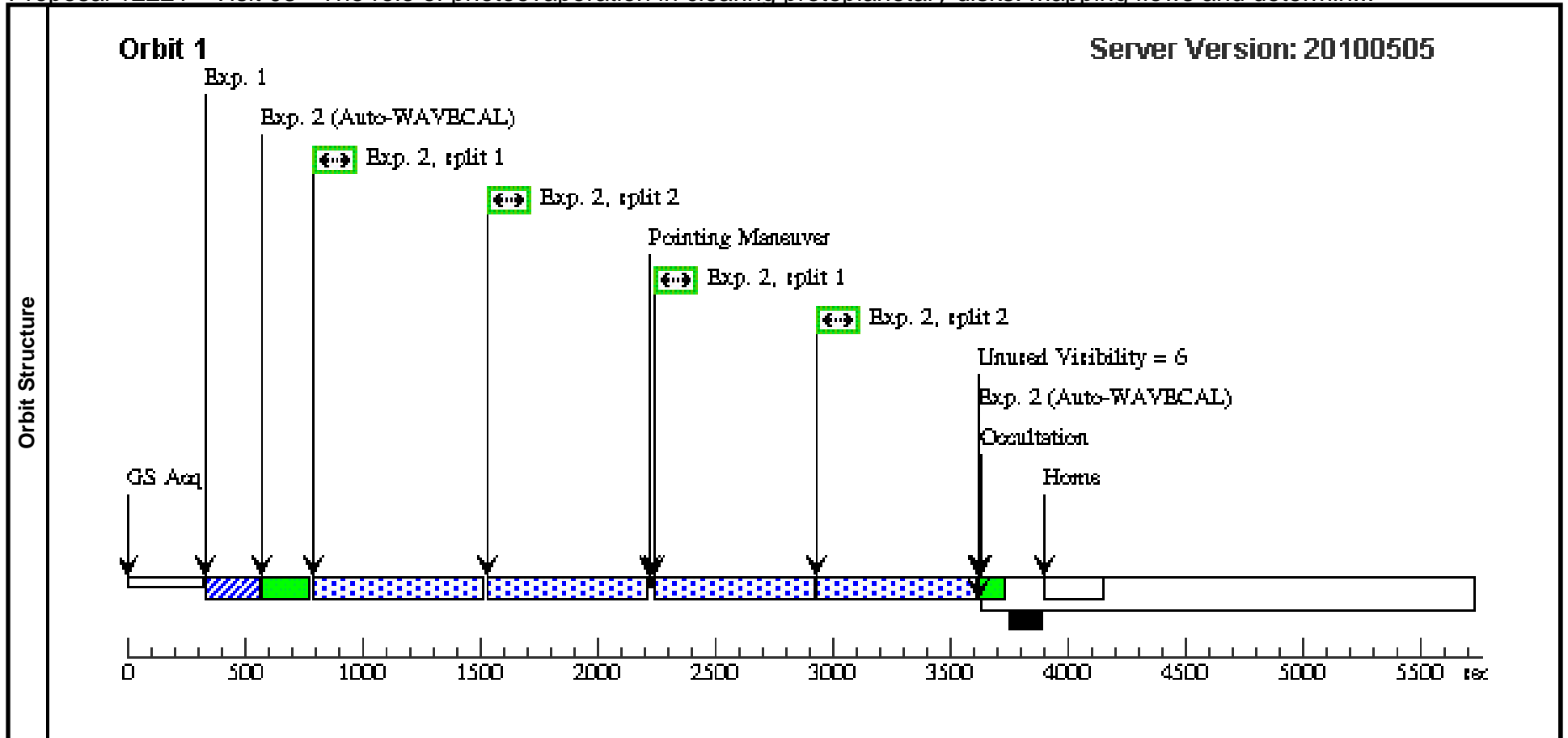
Visit	Proposal 12221, Visit 02 Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: ORIENT 85D TO 95D FROM 01; AFTER 01										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
		(1)	Pattern Type=STIS-ALONG-SLIT Purpose=DITHER Number Of Points=2 Point Spacing=0.2789 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=90.0 Angle Between Sides= Center Pattern=false				(2)			
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	V-TW-HYA	RA: 11 01 51.9063 (165.4662763d) Dec: -34 42 17.02 (-34.70473d) Equinox: J2000					V=11.07		Reference Frame: ICRS	
	<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Coordinates are from Hipparcos</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(1) V-TW-HYA	STIS/CCD, ACQ, F28X50LP	MIRROR					0.5 Secs		[1]
	2	(1) V-TW-HYA	STIS/CCD, ACCUM, 50CCD	G750M 6252 A			Pattern 1, Exps 2-2 (1)		1000. Secs [==>555.0 Secs (Pattern 1, Split 1)] [==>555.0 Secs (Pattern 1, Split 2)] [==>555.0 Secs (Pattern 2, Split 1)] [==>555.0 Secs (Pattern 2, Split 2)]		[1]



Proposal 12221 - Visit 02 - The role of photoevaporation in clearing protoplanetary disks: mapping flows and determin...

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Visit	Proposal 12221, Visit 03 Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: (none)									
	Patterns	#	Primary Pattern	Secondary Pattern	Exposures					
		(1)	Pattern Type=STIS-ALONG-SLIT Coordinate Frame=POS-TARG Purpose=DITHER Pattern Orientation=90.0 Number Of Points=2 Angle Between Sides= Point Spacing=0.2789 Center Pattern=false Line Spacing=		(2)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(2)	V-T-CHA	RA: 11 57 13.5305 (179.3063771d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000 <i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Coordinates are from Hipparcos</i>		V=11.86	Reference Frame: ICRS				
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(2) V-T-CHA		STIS/CCD, ACQ, F28X50LP	MIRROR				0.5 Secs [==>]	[1]
	<i>Comments: Note: T Cha is highly variable in V: literature values are from 11.2 to 12.7 in Vmag</i>									
2	(2) V-T-CHA		STIS/CCD, ACCUM, 50CCD	G750M 6252 A				Pattern 1, Exps 2-2 (1)	1000. Secs [==>644.0 Secs (Pattern 1, Split 1)] [==>644.0 Secs (Pattern 1, Split 2)] [==>644.0 Secs (Pattern 2, Split 1)] [==>644.0 Secs (Pattern 2, Split 2)]	[1]



Proposal 12221 - Visit 03 - The role of photoevaporation in clearing protoplanetary disks: mapping flows and determin...

Thu Jul 08 02:09:07 GMT 2010

Visit	Proposal 12221, Visit 04 Diagnostic Status: No Diagnostics Scientific Instruments: STIS/CCD Special Requirements: ORIENT 85D TO 95D FROM 03; AFTER 03										
	Patterns	#	Primary Pattern				Secondary Pattern			Exposures	
		(1)	Pattern Type=STIS-ALONG-SLIT Purpose=DITHER Number Of Points=2 Point Spacing=0.2789 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=90.0 Angle Between Sides= Center Pattern=false				(2)			
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(2)	V-T-CHA	RA: 11 57 13.5305 (179.3063771d) Dec: -79 21 31.54 (-79.35876d) Equinox: J2000					V=11.86	Reference Frame: ICRS		
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> <i>Coordinates are from Hipparcos</i>											
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]		Orbit
	1	(2) V-T-CHA		STIS/CCD, ACQ, F28X50LP	MIRROR				0.5 Secs		[1]
	2	(2) V-T-CHA		STIS/CCD, ACCUM, 50CCD	G750M 6252 A			Pattern 1, Exps 2-2 (1)	1000. Secs [==>644.0 Secs (Pattern 1, Split 1)] [==>644.0 Secs (Pattern 1, Split 2)] [==>644.0 Secs (Pattern 2, Split 1)] [==>644.0 Secs (Pattern 2, Split 2)]		[1]

