



14894 - Observing the Beta Pic Hill sphere transit in the far-UV

Cycle: 24, Proposal Category: GO

(UV Initiative)

(Availability Mode: AVAILABLE)

INVESTIGATORS

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Dr. Paul George Kalas (CoI)	University of California - Berkeley	kalas@berkeley.edu

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) -BET-PIC	COS/FUV	3	13-Jun-2017 21:04:33.0	yes
02	(1) -BET-PIC	COS/FUV	3	13-Jun-2017 21:04:37.0	yes
03	(1) -BET-PIC	COS/FUV	3	13-Jun-2017 21:04:40.0	yes

9 Total Orbits Used

ABSTRACT

Starting in April 2017, the Hill sphere of the directly-imaged planet Beta Pic b will start to transit its host-star, Beta Pic. During this event, material in the Hill sphere (e.g. left-over debris from planet formation, rings, gas torus around satellites, etc.) could transit the star. Photometric data from 1981, during a previous event, shows a potential transit signature. Using an accurate transit ephemeris that was just recently calculated, we can predict the exact dates of the upcoming passage. We propose to monitor this transit event using HST and the COS instrument over three visits. This is a very unique opportunity to monitor the transit of the environment of a ~20 million years old young planet that has been imaged in front of a 4th magnitude star; the next such transit will not happen again for another 20 years. The aims for this proposal are to 1) directly detect the composition of the gas in the Hill Sphere of a young planet 2) track the compositional variations as a function of the Hill Sphere radius 3) monitor temporal variations in the circumstellar dust and gas disk before and during the transit, and 4) determine the composition of exocomets present in the Beta Pic system which is independent of the transit of the Hill sphere.

OBSERVING DESCRIPTION

We have a total of three visits scheduled. Each visit consists of three orbits. Each visit has an identical observing strategies.

For each visit:

Orbit 1: Observe target centered in the aperture

Orbit 2: The target (Beta Pictoris) is to be offset -1.1 arcseconds in the dispersion direction

Orbit 3: The target (Beta Pictoris) is to be offset +1.1 arcseconds in the dispersion direction

The 1.1 arcsecond offsets shifts are important for the detection of hydrogen, nitrogen and oxygen which are all affected by airglow contamination.

An increase in the off-axis target distance along the dispersion

axis effectively shifts the line emission feature in wavelength relative to the airglow emission.

Proposal 14894 - Visit 1 (01) - Observing the Beta Pic Hill sphere transit in the far-UV

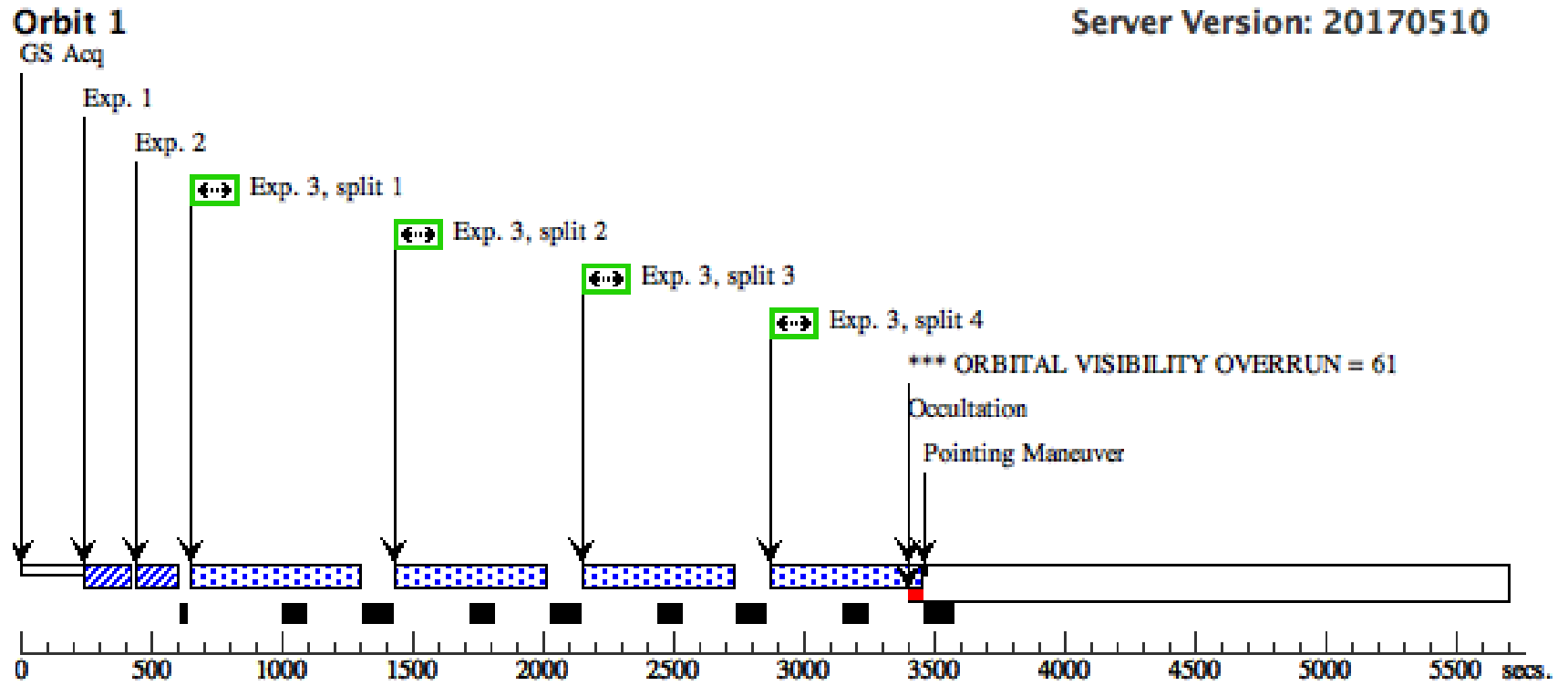
Wed Jun 14 01:04:41 GMT 2017

Visit	<p>Proposal 14894, Visit 1 (01), completed</p> <p>Diagnostic Status: Warning</p> <p>Scientific Instruments: COS/FUV</p> <p>Special Requirements: BETWEEN 20-APR-2017:00:00:00 AND 09-MAY-2017:00:00:00</p> <p><i>Comments: Orbit 1: Observe target centered in the aperture</i> <i>Orbit 2*: The target (Beta Pictoris) is to be offset -1.25 arcseconds in the dispersion direction</i> <i>Orbit 3: The target (Beta Pictoris) is to be offset +1.1 arcseconds in the dispersion direction</i></p> <p><i>In orbit 2 we perform an offset of -1.25 arcseconds compared to the standard -1.1 arcseconds. This is to test the effectiveness of the newly developed AVM technique (Wilson et al. 2016). This offset will allow us to better understand the AVM technique's ability to separate the stellar Ly-alpha signal away from contaminating airglow.</i></p>						
	Diagnostics	<p>(Visit 1 (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS</p> <p>(Visit 1 (01)) Warning (Orbit Planner): INEFFICIENT ORDERING OF FP-POS POSITIONS</p> <p>(Visit 1 (01)) Warning (Orbit Planner): ORBITAL VISIBILITY OVERRUN</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT</p> <p>(Visit 1 (01)) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE NO ORIENT</p>					
Fixed Targets		#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
		(1)	-BET-PIC	RA: 05 47 17.0877 (86.8211988d) Dec: -51 03 59.44 (-51.06651d) Equinox: J2000	Proper Motion RA: 4.65 mas/yr Proper Motion Dec: 83.10 mas/yr Parallax: 0.051" Epoch of Position: 2000	V=3.861	Reference Frame: ICRS
<p><i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i></p> <p><i>Extended=NO</i></p>							

Proposal 14894 - Visit 1 (01) - Observing the Beta Pic Hill sphere transit in the far-UV

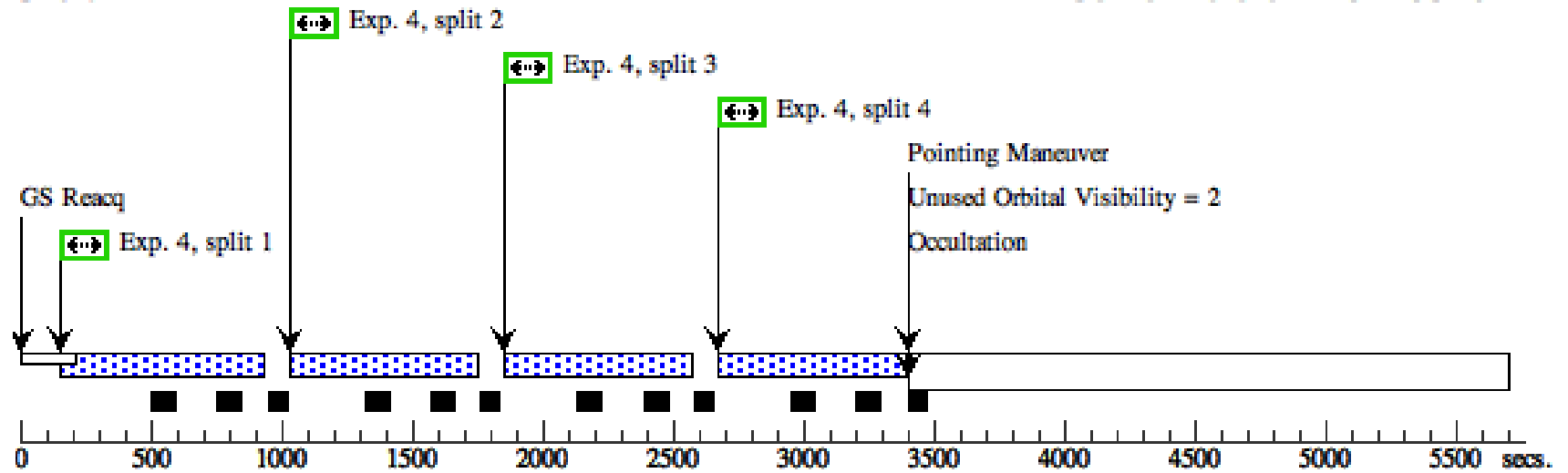
#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
Exposures	1	Positioning (COS.sa.729 672)	(1) -BET-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1327 A		Sequence 1-3 Non-Int in Visit 1 (01)	1.4 Secs (1.4 Secs) [==>]	[1]
	2	Max-Light (COS.sa.729 672)	(1) -BET-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1327 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9	Sequence 1-3 Non-Int in Visit 1 (01)	1.4 Secs (1.4 Secs) [==>]	[1]
	3	Center (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL	Sequence 1-3 Non-Int in Visit 1 (01)	534 Secs (2104 Secs) [==>526.0 Secs (Split 1)] [==>526.0 Secs (Split 2)] [==>526.0 Secs (Split 3)] [==>526.0 Secs (Split 4)]	[1]
	<i>Comments: The strength of the Stellar Lyman-alpha line has been set to an conservative upper limit to calculate the Buffer-time and check the Bright Objects Limit (FWHM=5 Angstrom, Flux=1e-11).</i>								
	4	Blueward-1. 25arcsec (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL	POS TARG -1.25,null	Sequence 4-4 Non-Int in Visit 1 (01)	534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]
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5	Redward+1. 1arcsec (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL	POS TARG 1.1,null	Sequence 5-5 Non-Int in Visit 1 (01)	534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]	[3]
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Orbit Structure



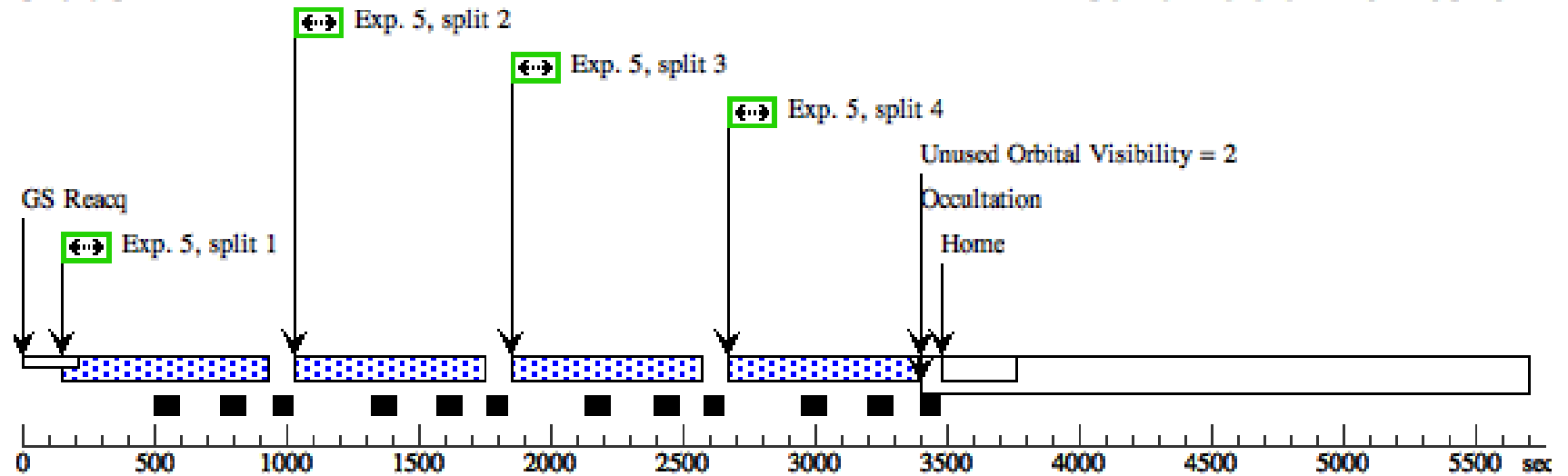
Orbit 2

Server Version: 20170510



Orbit 3

Server Version: 20170510

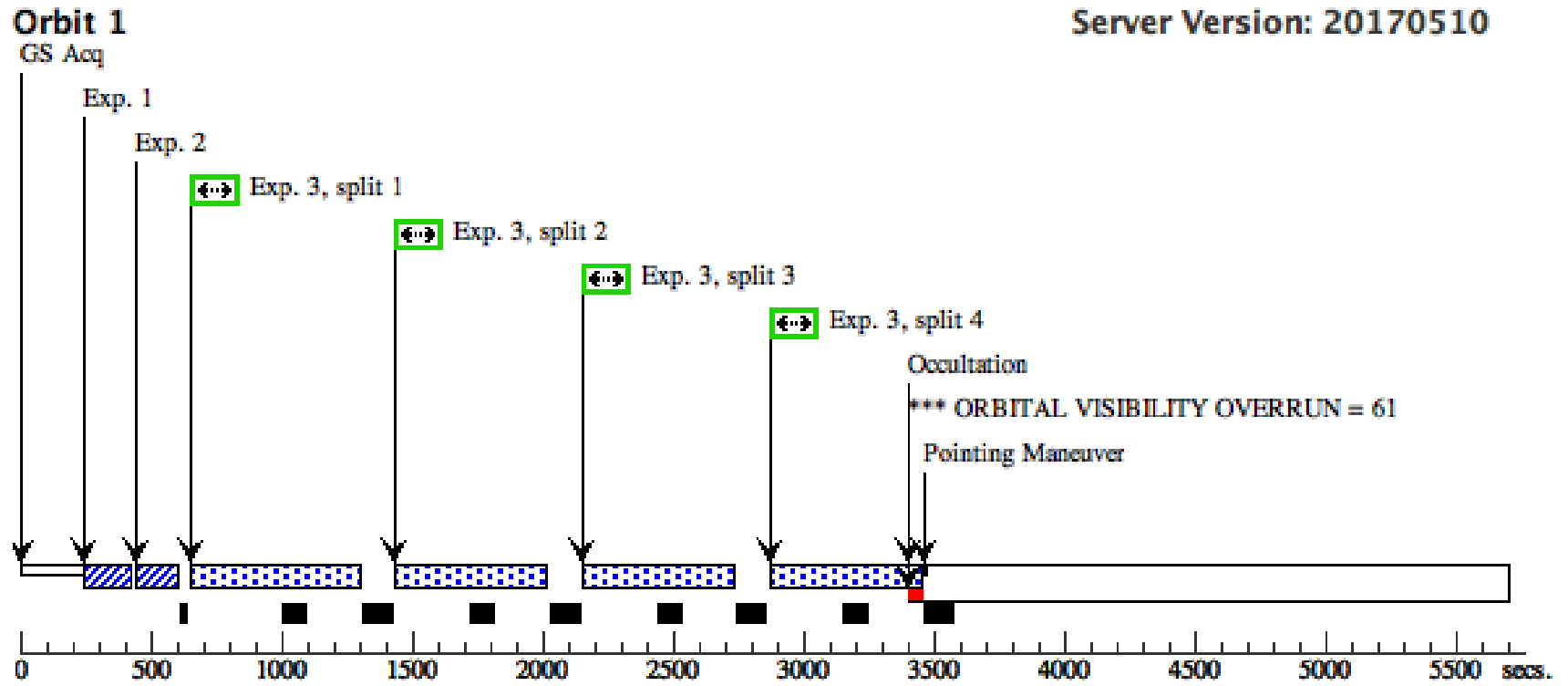


Proposal 14894 - Visit 2 (02) - Observing the Beta Pic Hill sphere transit in the far-UV

Wed Jun 14 01:04:41 GMT 2017

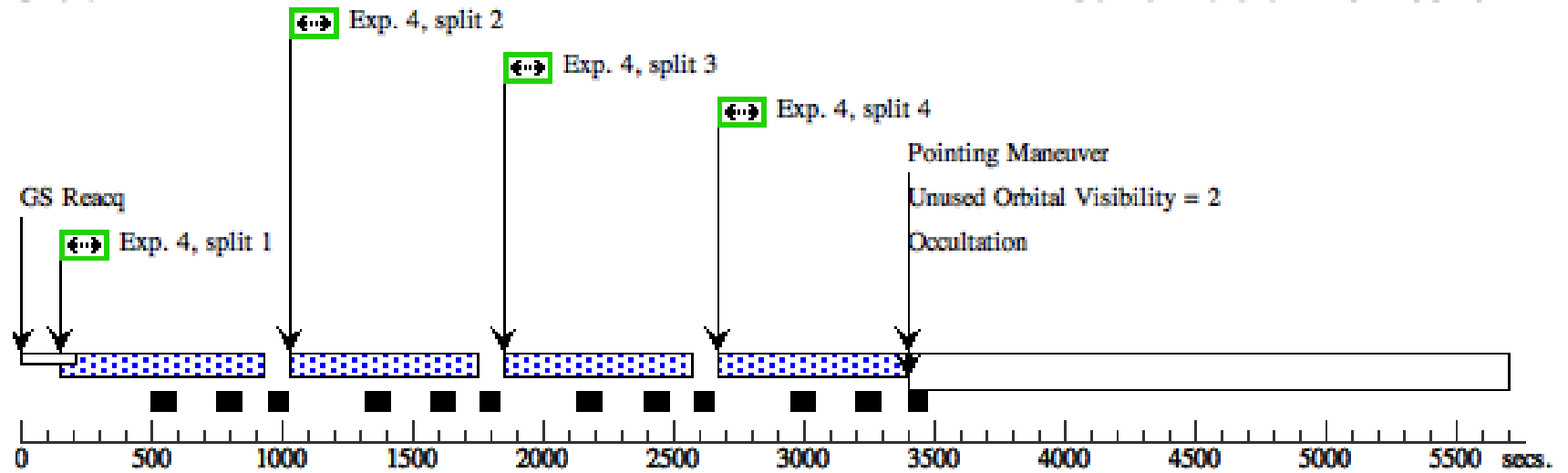
Visit	Proposal 14894, Visit 2 (02), completed Diagnostic Status: Warning Scientific Instruments: COS/FUV Special Requirements: AFTER 01; BETWEEN 08-JUN-2017:00:00:00 AND 03-JUL-2017:00:00:00 <i>Comments: Orbit 1: Observe target centered in the aperture Orbit 2: The target (Beta Pictoris) is to be offset -1.1 arcseconds in the dispersion direction Orbit 3: The target (Beta Pictoris) is to be offset +1.1 arcseconds in the dispersion direction</i>																																																																																																			
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Orbit Structure



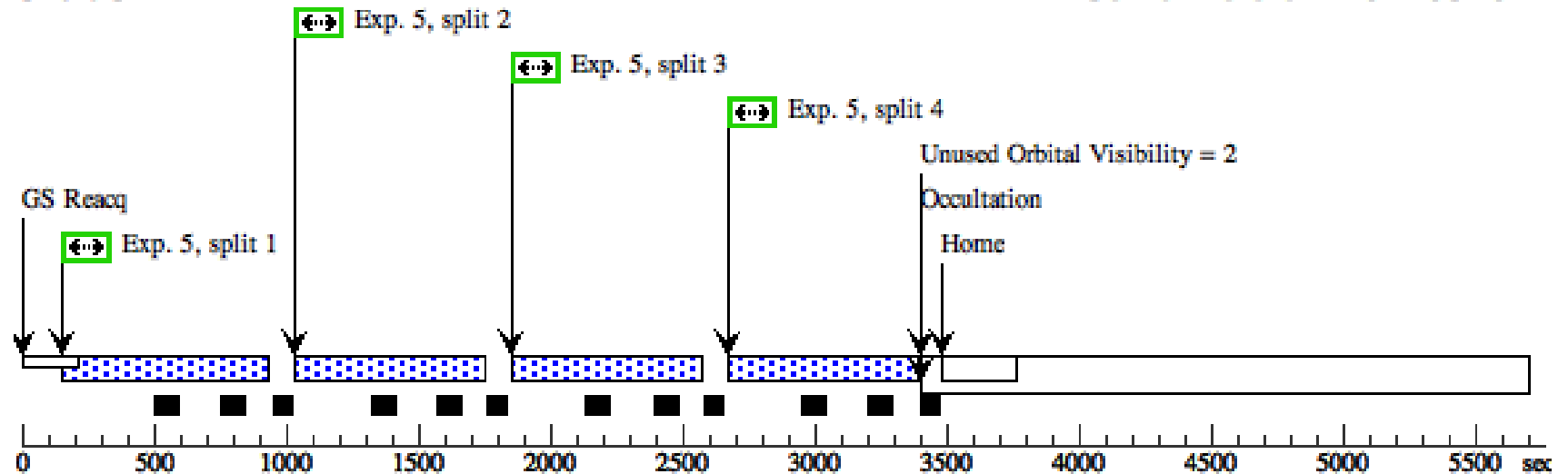
Orbit 2

Server Version: 20170510



Orbit 3

Server Version: 20170510

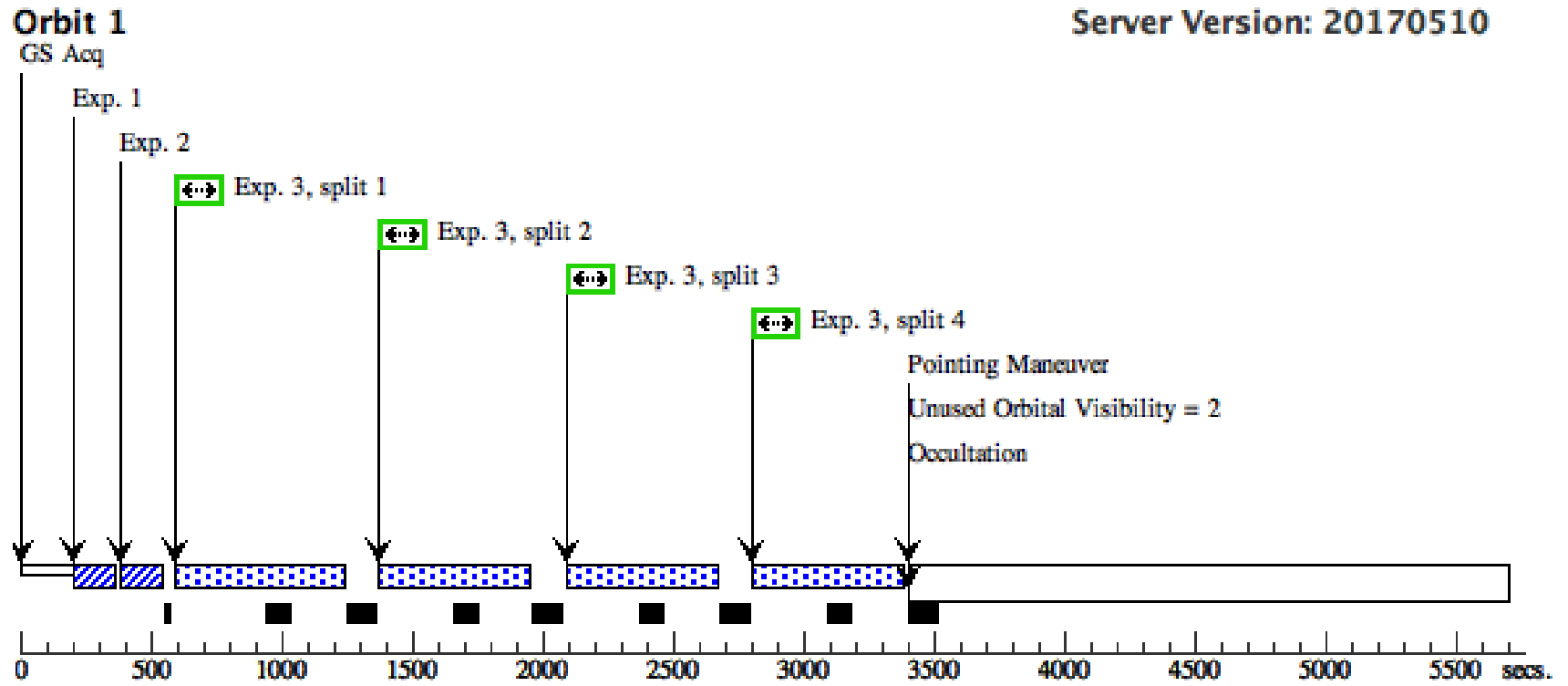


Proposal 14894 - Visit 3 (03) - Observing the Beta Pic Hill sphere transit in the far-UV

Wed Jun 14 01:04:42 GMT 2017

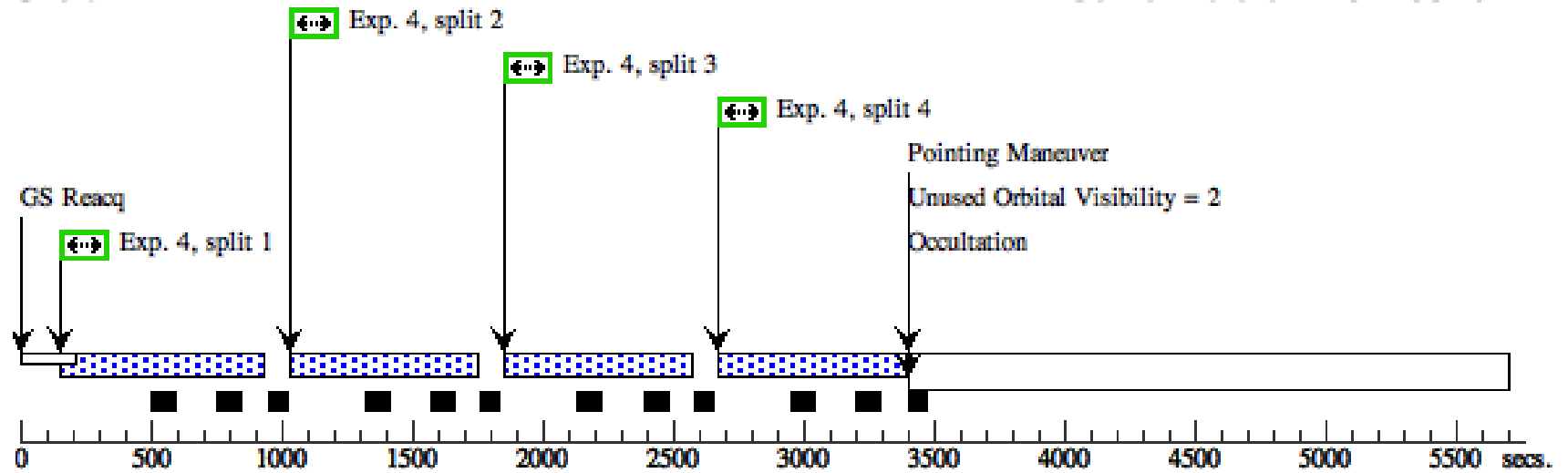
Visit	Proposal 14894, Visit 3 (03), scheduling Diagnostic Status: Warning Scientific Instruments: COS/FUV Special Requirements: AFTER 02; BETWEEN 02-AUG-2017:00:00:00 AND 16-AUG-2017:00:00:00 <i>Comments: Orbit 1: Observe target centered in the aperture</i> <i>Orbit 2: The target (Beta Pictoris) is to be offset -1.1 arcseconds in the dispersion direction</i> <i>Orbit 3: The target (Beta Pictoris) is to be offset +1.1 arcseconds in the dispersion direction</i>																																																																					
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Exposures	<table border="1"> <thead> <tr> <th>#</th> <th>Label (ETC Run)</th> <th>Target</th> <th>Config,Mode,Aperture</th> <th>Spectral Els.</th> <th>Opt. Params.</th> <th>Special Reqs.</th> <th>Groups</th> <th>Exp. Time (Total)/[Actual Dur.]</th> <th>Orbit</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Positioning (COS.sa.729 672)</td> <td>(1) -BET-PIC</td> <td>COS/FUV, ACQ/PEAKXD, PSA</td> <td>G130M 1327 A</td> <td>NUM-POS=1</td> <td></td> <td>Sequence 1-3 Non-Int in Visit 3 (03)</td> <td>1.4 Secs (1.4 Secs) [==>]</td> <td>[1]</td> </tr> <tr> <td>2</td> <td>Max-Light (COS.sa.729 672)</td> <td>(1) -BET-PIC</td> <td>COS/FUV, ACQ/PEAKD, PSA</td> <td>G130M 1327 A</td> <td>CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9</td> <td></td> <td>Sequence 1-3 Non-Int in Visit 3 (03)</td> <td>1.4 Secs (1.4 Secs) [==>]</td> <td>[1]</td> </tr> <tr> <td>3</td> <td>Center (COS.sp.848 182)</td> <td>(1) -BET-PIC</td> <td>COS/FUV, TIME-TAG, PSA</td> <td>G130M 1327 A</td> <td>BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL</td> <td></td> <td>Sequence 1-3 Non-Int in Visit 3 (03)</td> <td>534 Secs (2104 Secs) [==>526.0 Secs (Split 1)] [==>526.0 Secs (Split 2)] [==>526.0 Secs (Split 3)] [==>526.0 Secs (Split 4)]</td> <td>[1]</td> </tr> <tr> <td>4</td> <td>Blueward-1. 1arcsec (COS.sp.848 182)</td> <td>(1) -BET-PIC</td> <td>COS/FUV, TIME-TAG, PSA</td> <td>G130M 1327 A</td> <td>BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL</td> <td>POS TARG -1.1,null</td> <td>Sequence 4-4 Non-Int in Visit 3 (03)</td> <td>534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]</td> <td>[2]</td> </tr> <tr> <td>5</td> <td>Redward+1. 1arcsec (COS.sp.848 182)</td> <td>(1) -BET-PIC</td> <td>COS/FUV, TIME-TAG, PSA</td> <td>G130M 1327 A</td> <td>BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL</td> <td>POS TARG 1.1,null</td> <td>Sequence 5-5 Non-Int in Visit 3 (03)</td> <td>534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]</td> <td>[3]</td> </tr> </tbody> </table>										#	Label (ETC Run)	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit	1	Positioning (COS.sa.729 672)	(1) -BET-PIC	COS/FUV, ACQ/PEAKXD, PSA	G130M 1327 A	NUM-POS=1		Sequence 1-3 Non-Int in Visit 3 (03)	1.4 Secs (1.4 Secs) [==>]	[1]	2	Max-Light (COS.sa.729 672)	(1) -BET-PIC	COS/FUV, ACQ/PEAKD, PSA	G130M 1327 A	CENTER=DEF; NUM-POS=5; STEP-SIZE=0.9		Sequence 1-3 Non-Int in Visit 3 (03)	1.4 Secs (1.4 Secs) [==>]	[1]	3	Center (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL		Sequence 1-3 Non-Int in Visit 3 (03)	534 Secs (2104 Secs) [==>526.0 Secs (Split 1)] [==>526.0 Secs (Split 2)] [==>526.0 Secs (Split 3)] [==>526.0 Secs (Split 4)]	[1]	4	Blueward-1. 1arcsec (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL	POS TARG -1.1,null	Sequence 4-4 Non-Int in Visit 3 (03)	534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]	[2]	5	Redward+1. 1arcsec (COS.sp.848 182)	(1) -BET-PIC	COS/FUV, TIME-TAG, PSA	G130M 1327 A	BUFFER-TIME=25 0; FLASH=YES; FP-POS=ALL	POS TARG 1.1,null	Sequence 5-5 Non-Int in Visit 3 (03)	534 Secs (2656 Secs) [==>664.0 Secs (Split 1)] [==>664.0 Secs (Split 2)] [==>664.0 Secs (Split 3)] [==>664.0 Secs (Split 4)]	[3]
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Orbit Structure



Orbit 2

Server Version: 20170510



Orbit 3

Server Version: 20170510

