11571 - A Fundamental Test of Accretion Physics with NGC 4203

Cycle: 17, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

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VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(1) NGC4203	STIS/CCD	5	01-Jul-2008 21:13:37.0	yes

5 Total Orbits Used

ABSTRACT

The rapid evolution of quasars indicates that supermassive black holes in galaxy nuclei spend most of their time in a relatively quiescent state. Studies of nearby galaxies demonstrate that many such black holes are accreting at a low rate, and appear as low-luminosity active galactic nuclei (LLAGNs). Theoretical arguments suggest that the mode of accretion onto a central black hole may be very different in LLAGNs as compared to high-luminosity systems. The LINER NGC 4203 provides an excellent opportunity to investigate quantitatively the accretion process in a LLAGN,

and hence the typical accretion state for a supermassive black hole. Cycle 7 STIS data acquired at one position angle reveal double-peaked H-alpha emission in the nucleus that may trace an accretion disk, and spatially resolved emission that places an upper limit on black-hole mass. We propose observations with STIS to map the two-dimensional velocity field of the circumnuclear gas disk in the central regions of NGC 4203, in order to measure the black-hole mass. This parameter is essential for testing theoretical models of accretion, determining the mass accretion rate, and estimating the radiative efficiency for accreted matter. The results will be important for making sense of LLAGNs, and for translating their measured luminosity into accretion rates that trace the growth of black holes. This is a resubmission of a proposal that was approved for 5 orbits in Cycle 13 (GO-10191) but never carried out due to the failure of STIS.

OBSERVING DESCRIPTION

STIS spectra will be obtained for the nucleus of NGC 4203 at 5 adjacent slit positions to measure spatially resolved nebular emission, which will be used to determine the gas velocity field. The observations will employ the G750M grating at a central wavelength of 6581 A, and the 52X0.1E1 aperture to minimize CTE losses. The slit should be oriented approximately perpendicular (+/- 20 degrees) to an existing STIS spectrum for this object, to optimize spatial coverage. At each slit position, observations will be dithered along the slit to enable cosmic ray and bad pixel rejection. The program will be completed in a single visit of 5 orbits.

Visit

Proposal 11571, Visit 01, implementation Wed Jul 02 01:13:45 GMT 2008

Diagnostic Status: Warning

Scientific Instruments: STIS/CCD

Special Requirements: PCS MODE FINE; ORIENT 40.6D TO 80.6 D; ORIENT 220.6D TO 260.6 D

Comments: ORIENT constraint assumes a slit PA of 175.6 to 215.6 degrees, and offset angle of 45 degrees.

Diagnostics

(Visit 01) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE
(Visit 01) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE
(Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(Visit 01) Warning (Orbit Planner): POS TARG OUTSIDE OF APERTURE
(Visit 01) Warning (Orbit Planner): PATTERN POSITION OUTSIDE APERTURE

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=STIS-ALONG-SLIT	Coordinate Frame=POS-TARG		(9), (10), (11)
	Purpose=DITHER	Pattern Orientation=90.0		
	Number Of Points=3	Angle Between Sides=		
	Point Spacing=0.25	Center Pattern=false		
	Line Spacing=			

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC4203	RA: 12 15 5.0200 (183.7709167d) Dec: +33 11 50.70 (33.19742d) Equinox: J2000		V=11.6	Reference Frame: ICRS

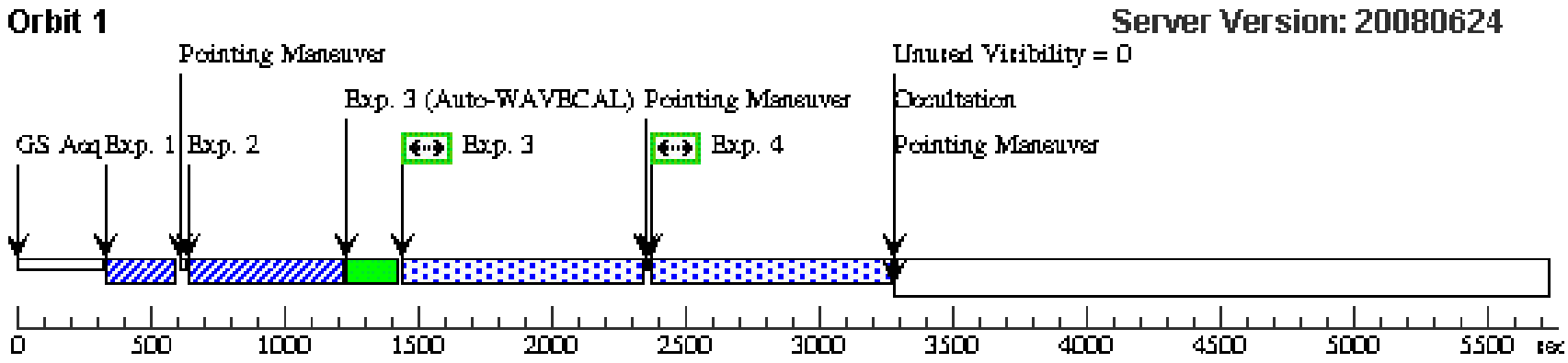
Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1		(1) NGC4203	STIS/CCD, ACQ, F28X50LP	MIRROR				10.0 Secs	
								[==>]	***[1]***
2		(1) NGC4203	STIS/CCD, ACQ/PEAK, 52X0.1E1	MIRROR				30.0 Secs	
								[==>]	***[1]***
3		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO			860.0 Secs	
								[==>]	***[1]***
4		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.0,0.25		860.0 Secs	
								[==>]	***[1]***
5		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.0,-0.25		728.0 Secs	
								[==>]	***[2]***
6		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.1,-0.25		1059.0 Secs	
								[==>]	***[2]***
7		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.1,0.0		1059.0 Secs	
								[==>]	***[2]***

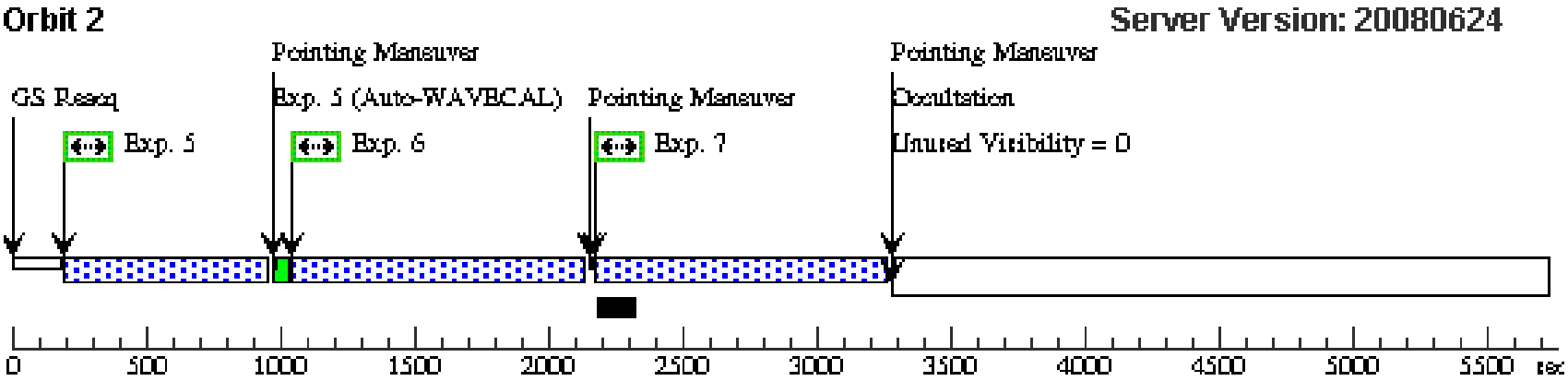
Exposures (continued)

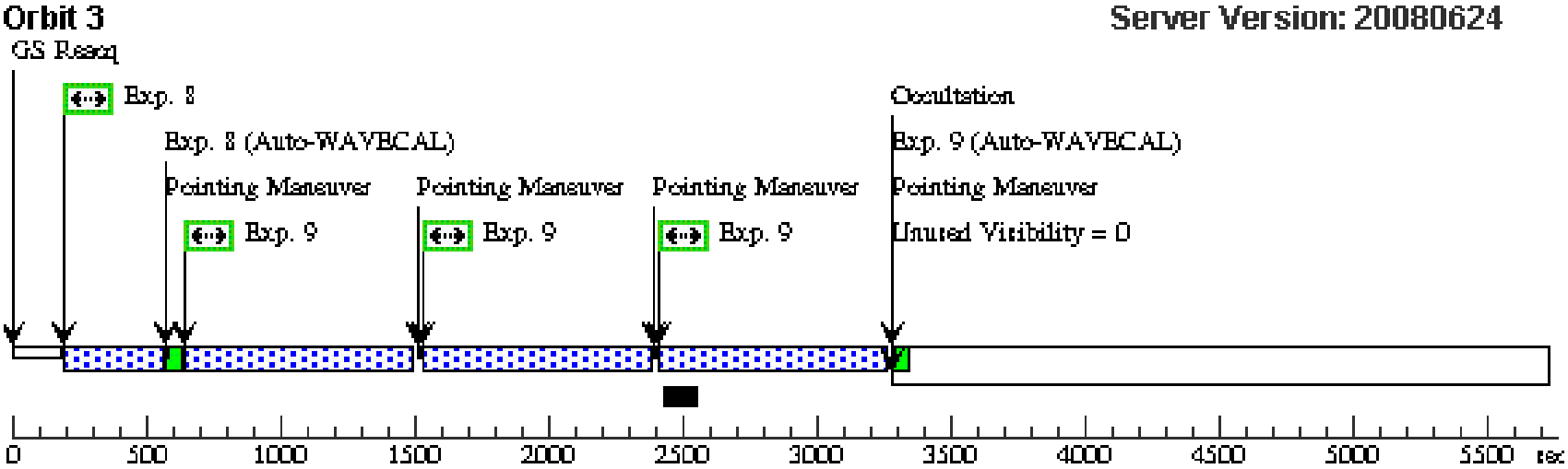
#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
8		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.1,0.25		331.0 Secs	
								[==>]	***[3]***
9		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG -0.1,0.0	Pattern 9-9 (1)	815.0 Secs	
								[==>(Pattern 1)]	
								[==>(Pattern 2)]	***[3]***
								[==>(Pattern 3)]	
10		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG -0.2,0.0	Pattern 10-10 (1)	966.0 Secs	
								[==>(Pattern 1)]	
								[==>(Pattern 2)]	***[4]***
								[==>(Pattern 3)]	
11		(1) NGC4203	STIS/CCD, ACCUM, 52X0.1E1	G750M 6581 A	CR-SPLIT=NO	POS TARG 0.2,0.0	Pattern 11-11 (1)	966.0 Secs	
								[==>(Pattern 1)]	
								[==>(Pattern 2)]	***[5]***
								[==>(Pattern 3)]	

Orbit Structure



Orbit Structure (continued)





Orbit Structure (continued)