14266 - Confirming NGC6946 BH1 - A Black Hole Formed in a Failed Supernova

Cycle: 23, 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) NGC6946BH1	WFC3/IR WFC3/UVIS	2	28-Aug-2015 21:06:21.0	yes

2 Total Orbits Used

ABSTRACT

There are good observational and theoretical reasons to believe that 10-30% of the core-collapses of massive stars lead to the formation of black holes without a supernova explosion. We have been carrying out the first observational search for such failed supernovae using the Large Binocular Telescope. From the first four years of the survey, we are left with one good candidate, NGC6946 BH1. Deep HST and SST observations are needed to better constrain the vanishing of this massive star than is possible

from the ground. Confirmation of the formation of a black hole in a failed supernova would represent one of the most exciting results by HST both scientifically and for the public.

OBSERVING DESCRIPTION

The goal is to obtain two optical (F606W and F814W) and two IR (F110W and F160W) WFC3 images of a candidate failed supernova, where a massive star has undergone core collapse to form a black hole without an external supernova explosion. The optical filters are chosen to match the archival data available for the source prior to the event.

For UVIS, observing filter 1 at all dither points followed by filter 2 at all dither points produced slightly higher total integration times than interleaving the filters. There are 50 unused seconds in visit 03 WFC3/IR for which there was no efficient filler given the quantization of the WFC3/IR observing modes. However, mixing the optical/IR filters in each orbit (where auto-adjust on the optical would fill the time) seems to consistently produce slightly less total integration time.

There is not strong need to coordinate the HST and Spitzer observations. Any evolution should be slow enough at this point to remove the need for adding a constraint.

Visit

Proposal 14266, Visit 01, implementation Sat Aug 29 01:06:22 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: (none)

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-UVIS-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.135 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=46.84 Angle Between Sides= Center Pattern=false		(1), (2)
(2)	Pattern Type=WFC3-IR-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.636 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(3-5)

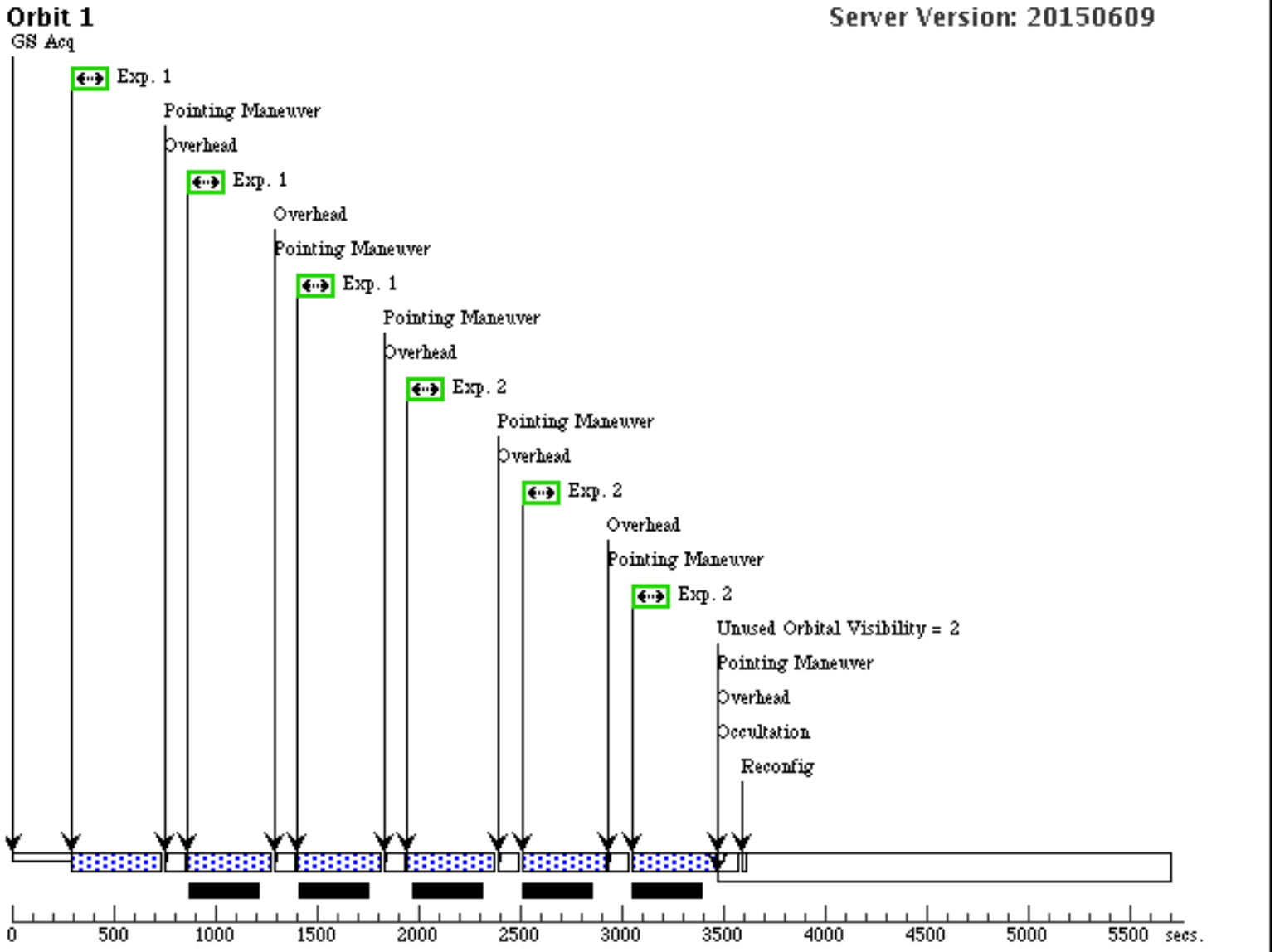
Fixed Targets

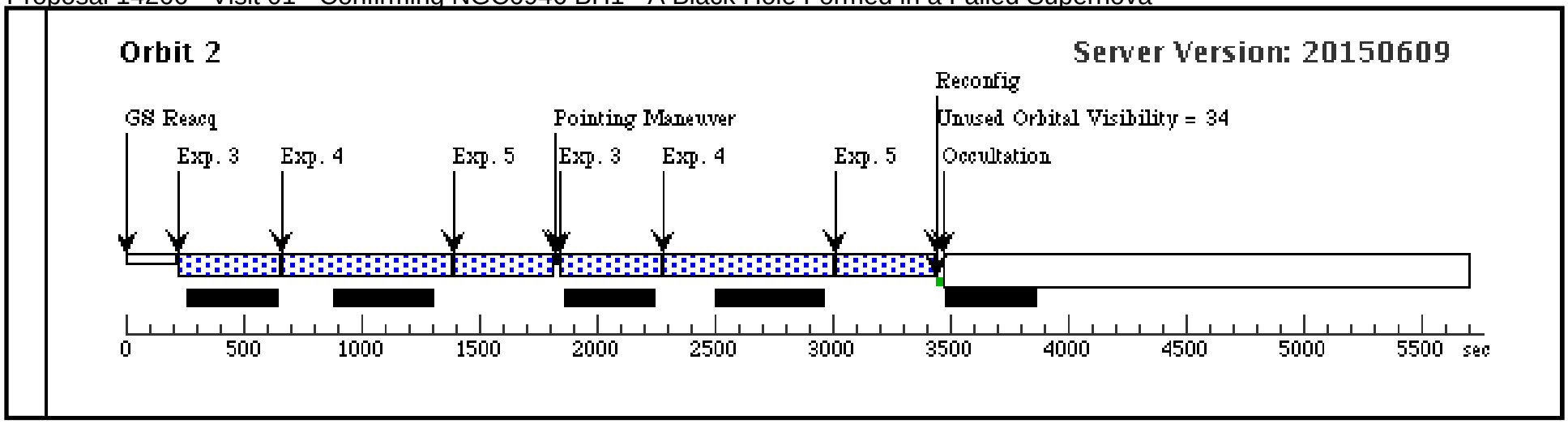
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	NGC6946BH1	RA: 20 35 27.5600 (308.8648333d) Dec: +60 08 8.29 (60.13564d) Equinox: J2000		V=25	Reference Frame: J2000

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) NGC6946BH1	WFC3/UVIS, ACCUM, UVIS1	F606W			Pattern 1, Exps 1-1 in Visit 01 (1)	400 Secs (1233 Secs) *[==>411.0 Secs (Pattern 1)]* *[==>411.0 Secs (Pattern 2)]* *[==>411.0 Secs (Pattern 3)]*	***[1]***
2		(1) NGC6946BH1	WFC3/UVIS, ACCUM, UVIS1	F814W	FLASH=2		Pattern 1, Exps 2-2 in Visit 01 (1)	400 Secs (1233 Secs) *[==>411.0 Secs (Pattern 1)]* *[==>411.0 Secs (Pattern 2)]* *[==>411.0 Secs (Pattern 3)]*	***[1]***
3		(1) NGC6946BH1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=STEP50		Pattern 2, Exps 3-5 in Visit 01 (2)	399.233383 Secs (798.467 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
4		(1) NGC6946BH1	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=13; SAMP-SEQ=STEP100		Pattern 2, Exps 3-5 in Visit 01 (2)	699.232615 Secs (1398.465 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***
5		(1) NGC6946BH1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=13; SAMP-SEQ=STEP50		Pattern 2, Exps 3-5 in Visit 01 (2)	399.233383 Secs (798.467 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20150609
Reconfig
GS Reacq
Pointing Maneuver
Unused Orbital Visibility = 34
Exp. 3
Exp. 4
Exp. 5
Exp. 3
Exp. 4
Exp. 5
Occultation
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec