14091 - Bulge structure and kinematics in an extreme spiral galaxy hosting megaparsec-scale radio jets.

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) 2MASX-J23453268-0449256	WFC3/IR WFC3/UVIS	2	13-Oct-2015 21:21:35.0	yes

2 Total Orbits Used

ABSTRACT

The radio galaxy 2MASX J23453268-0449256 is an extreme object with unprecedented properties. It is a disk-dominated and unusually massive red spiral with a rotation speed of 430 km/s at r=15 kpc, and its Mpc-scale radio jets are the largest ever found emerging from a spiral host. Ground-based imaging suggests that its central component is a pseudobulge, and its central stellar velocity dispersion is 350 km/s, surprisingly high for a

disk-dominated spiral. X-ray observations show indications of radio-mode feedback on the hot gaseous halo on scales of tens of kpc, also extremely unusual for a spiral galaxy environment. This object challenges the conventional wisdom that the hosts of large-scale radio jets are exclusively early-type galaxies. We propose to obtain new WFC3 optical and IR imaging and Gemini GMOS-IFU spectroscopy of J2345. With the new HST imaging, we will carry out definitive bulge/disk decompositions and quantify the bulge structural parameters accurately, essential for understanding the environment of the central black hole powering the radio jets. GMOS IFU data will provide high-quality spatially resolved measurements of the stellar and gas kinematics of the bulge, which will be used to model the mass distribution in this unique system. Together, these observations will enable us to accurately quantify the structure and kinematics of this extreme galaxy and clarify its physical properties and formation history.

OBSERVING DESCRIPTION

Our WFC3 observations will be carried out in two UVIS filters, F438W and F814W, and one IR filter, F160W. We will use two orbits for the imaging. The first orbit will be used for F160W and F814W imaging, and the second orbit will be used for F438W. In each filter, we will use a 3-point line dither pattern.

For the IR observation, we will use SAMP-SEQ=STEP25 and NSAMP=12, giving a total of 3*199 sec of exposure time. For the UVIS exposures, according to the WFC3 ETC, a post-flash will not be needed for F814W. For F438W we will use a small post-flash in order to help ensure that we achieve at least the recommended 12 e-/pixel, and FLASH=5 is the minimum amount needed in order to reach the recommended background level.

After consultation with STSCI staff the observation sequence was designed to fit within a 51-minute visibility period rather than the full duration of the orbital visibility for this target (53 minutes) in order to allow for scheduling windows that would permit acquisition of two guide stars.

In this revised Phase II submission, we have restricted the ORIENT angle range to 305-325 degrees. This angle range will ensure that diffraction spikes from a bright foreground star will not overlap our target, while still allowing for suitable guide stars and visit schedulability. The observations were shortened slightly to fit within a 50-minute visibility window in order to allow for feasible scheduling windows.

Visit

Proposal 14091, Visit 01, implementation Wed Oct 14 01:21:36 GMT 2015

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: ORIENT 305D TO 325 D

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(3)	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		(2), (3)
(4)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=0.605 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(1)

Fixed Targets

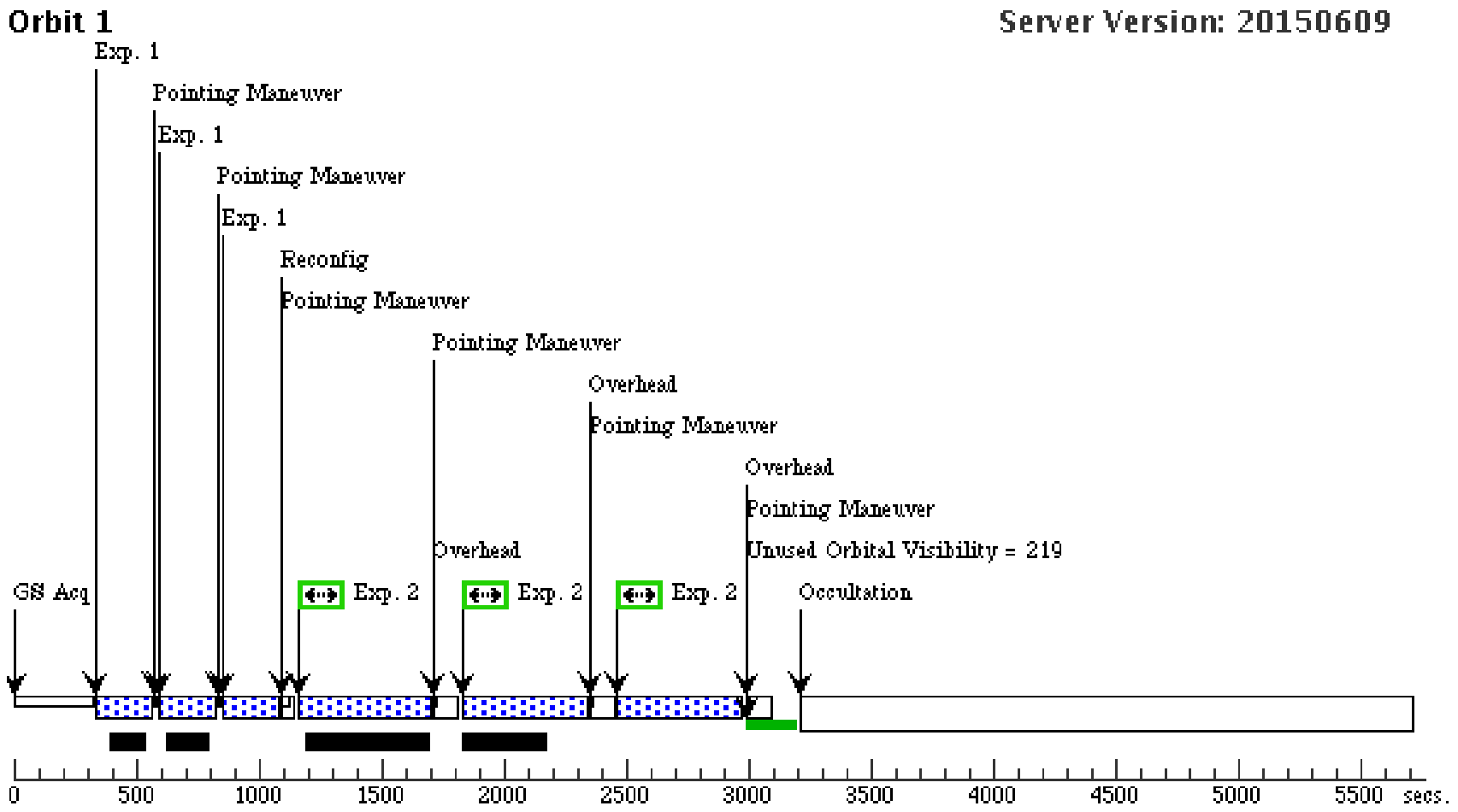
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	2MASX-J23453268-0449256	RA: 23 45 32.6880 (356.3862000d) Dec: -04 49 25.62 (-4.82378d) Equinox: J2000		V=(?) SDSS r = 14.7 mag	Reference Frame: SIMBAD

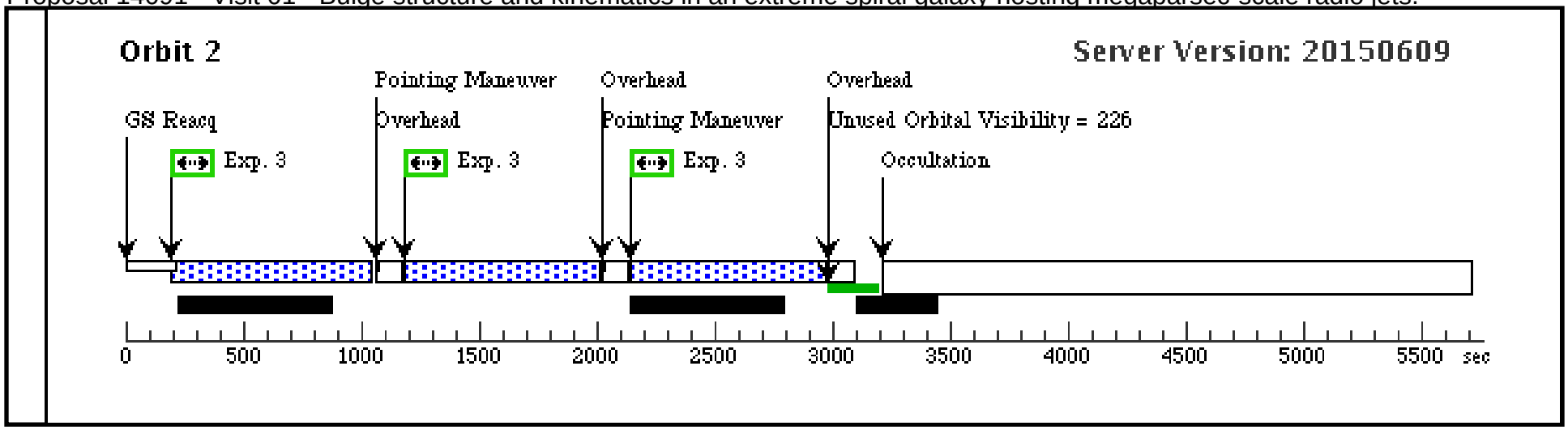
Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
Extended=YES

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1		(1) 2MASX-J23453268-0449256	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=12; SAMP-SEQ=STEP25		Pattern 4, Exps 1-1 in Visit 01 (4)	199.233316 Secs (597.7 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
2		(1) 2MASX-J23453268-0449256	WFC3/UVIS, ACCUM, UVIS2	F814W	CR-SPLIT=NO		Pattern 3, Exps 2-2 in Visit 01 (3)	510 Secs (1530 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***
3		(1) 2MASX-J23453268-0449256	WFC3/UVIS, ACCUM, UVIS2	F438W	CR-SPLIT=NO; FLASH=5		Pattern 3, Exps 3-3 in Visit 01 (3)	830 Secs (2490 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[2]***

Orbit Structure




Orbit 2
Server Version: 20150609
GS Reacq
Exp. 3
Pointing Maneuver
Overhead
Exp. 3
Overhead
Pointing Maneuver
Exp. 3
Overhead
Occultation
Unused Orbital Visibility = 226
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
sec