



15311 - Confirming the Formation of a Black Hole

Cycle: 25, 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) NGC6946-BH1	WFC3/IR	1	18-Jul-2017 19:04:02.0	yes

1 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 seven years of LBT survey data we have one good candidate, NGC6946-BH1. HST observations in 2015 found a possible near-IR counterpart to the candidate that is significantly less luminous than the progenitor. If the source is related to BH1, this could be either emission from late time accretion luminosity or obscuration of a surviving

star by an expanding shell of dust too cool to be detected in our warm SST observations. New HST WFC3/IR observations of the source should find that the source is either fainter (late-time accretion) or brighter (obscured by an expanding shell). This is critical information to inform proposals for JWST observations to search for colder dust.

OBSERVING DESCRIPTION

The goal is to obtain 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 filters and exposure times are chosen to match our previous observations.

Proposal 15311 - Visit 01 - Confirming the Formation of a Black Hole

Tue Jul 18 23:04:03 GMT 2017

Visit	Proposal 15311, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR Special Requirements: (none)		

Patterns	#	Primary Pattern	Secondary Pattern	Exposures
	(1)	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	(1-2)

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	NGC6946-BH1	RA: 20 35 27.5600 (308.8648333d) Dec: +60 08 8.29 (60.13564d) Equinox: J2000		V=28.4 F110W 23.8 F160W 22.4 in cycle 23	Reference Frame: J2000

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) NGC6946-BH1	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=11; SAMP-SEQ=STEP100		Pattern 1, Exps 1-2 in Visit 01 (1)	499.231969 Secs (1497.696 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]
	2		(1) NGC6946-BH1	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=14; SAMP-SEQ=STEP50		Pattern 1, Exps 1-2 in Visit 01 (1)	449.233834 Secs (1347.702 Secs) [=>(Pattern 1)] [=>(Pattern 2)] [=>(Pattern 3)]	[1]

