



14253 - Verifying the progenitor identification of the type II-P supernova 2009ib

Cycle: 23, 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) SN-2009IB	WFC3/UVIS	2	23-Jul-2015 23:21:36.0	yes

2 Total Orbits Used

ABSTRACT

There have been several examples where archival HST images were used to directly identify the progenitor of a supernova (SN), but only a handful of cases were published, where the identification was confirmed by taking HST imaging after the SN faded. We propose such late time observations to revisit the field of the type II-P SN 2009ib and obtain deep, high resolution images with WFC3 UVIS. In the pre-explosion images a yellow source was visible at the position of the SN, even though so far the progenitors of SNe II-P have been found to be red supergiant stars. There are several scenarios that can explain the detection, including the superposition of multiple sources or a compact cluster. With the proposed observations we will be able to decide among the scenarios, as well as constrain the luminosity and the initial mass of the progenitor and study the immediate environment of the SN.

OBSERVING DESCRIPTION

The goal of our program is to obtain deep imaging of the site of the Type II-P supernova 2009ib with WFC3 UVIS in order to study its progenitor system and environment. We will use the filters F438W, F606W and F814W, which are the most similar to the filters that were used when the pre-explosion images were taken. We also plan to use the filter F336W, because one of the scenarios we would like to test assumes a blue supergiant companion star.

We will use the full detector and place our target at the optimum center of chip 2 (UVIS2). Since our target is located in one of the spiral arms of a large galaxy, by placing our target this way we will be able to cover almost the entire galaxy according to the Aladdin tool in APT. These will be the deepest images ever obtained of this galaxy and might prove to be useful for the community in the future.

In order to put constraints on the progenitor system and study the environment we aim to reach much deeper magnitude limits than the pre-explosion images had. We will integrate for 1080s in F336W, 1215s in F438W, 1350s in F606W and 1365s in F814W band. According to ETC, with these exposure times we can expect to reach the 5sigma detection limits of 24.5 mag in F336W, 26 mag in F438W, 27 mag in F606W and 26 mag in F814W band. According to the BOT there are no dangerously bright objects on the field. We plan to use 3 point dithering to correct for cosmic rays and hot pixels and to improve the sampling of the PSF. The exposures with filters F336W, F438W and F814W require post-flash to increase the background level to 12 e-/px and to mitigate against CTE losses.

Proposal 14253 - Visit 01 - Verifying the progenitor identification of the type II-P supernova 2009ib

Fri Jul 24 03:21:38 GMT 2015

Visit	Proposal 14253, Visit 01 Diagnostic Status: No Diagnostics Scientific Instruments: 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), (3), (4)					
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SN-2009IB	RA: 04 17 40.0900 (64.4170417d) Dec: -62 46 40.30 (-62.77786d) Equinox: J2000		V=24	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i>										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	(1) SN-2009IB	(1) SN-2009IB	WFC3/UVIS, ACCUM, UVIS2	F814W	FLASH=2		Pattern 1, Exps 1-1 i n Visit 01 (1)	455 Secs (1365 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
	2	(1) SN-2009IB	(1) SN-2009IB	WFC3/UVIS, ACCUM, UVIS2	F336W	FLASH=11		Pattern 1, Exps 2-2 i n Visit 01 (1)	360 Secs (1080 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[1]
3	(1) SN-2009IB	(1) SN-2009IB	WFC3/UVIS, ACCUM, UVIS2	F606W				Pattern 1, Exps 3-3 i n Visit 01 (1)	450 Secs (1350 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]
4	(1) SN-2009IB	(1) SN-2009IB	WFC3/UVIS, ACCUM, UVIS2	F438W		FLASH=9		Pattern 1, Exps 4-4 i n Visit 01 (1)	405 Secs (1215 Secs)	
									[==>(Pattern 1)] [==>(Pattern 2)] [==>(Pattern 3)]	[2]



