



# 12574 - The Final Word on the Progenitor of the Type II-Plateau Supernova SN 2006ov

Cycle: 19, 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-2006OV	ACS/WFC	1	09-Jul-2011 01:50:01.0	yes

1 Total Orbits Used

## ABSTRACT

Despite recent rapid progress, the field of supernova (SN) progenitor identification remains in its infancy, with only five supernovae having had unambiguous detection and characterization of their progenitor stars made. The existence of deep pre-SN WFPC2 images of the site of the nearby core-collapse (Type II-Plateau) SN 2006ov has enabled two independent searches for its progenitor star to be carried out. While both studies agree that an object is located at the location of SN 2006ov in the pre-SN images, they disagree on whether the light from this source (or, part of it) is, in fact, coming from the actual progenitor star. The time is ripe to settle the issue: A single-orbit reobservation of the SN site with HST/ACS will permit the definitive determination of whether this object is indeed associated with SN 2006ov. If it is, and its flux is found to have diminished (it was an extended source) or vanished (it was an isolated star), then this will enable the third conclusive characterization of a Type II-Plateau supernova's progenitor star's properties to be made. If it is not, then a firm upper mass limit on the progenitor star will be confidently declared the final word on the topic.

## **OBSERVING DESCRIPTION**

This phase II proposal outlines observations of the site of supernova SN 2006ov to be taken during one orbit. The principal aim is to acquire high-resolution images in two photometric bands (B and I; filters F435W and F814W, respectively) with ACS/WFC to compare with images taken in the same bandpasses (using WFPC2) prior to the supernova explosion. The observations here are being carried out in an effort to evaluate the status of a possible "progenitor star" that was identified in the pre-supernova images. Note that SN 2006ov itself will not be visible in the new images, as it is expected to have faded well below detectability (estimated I-band magnitude of  $\sim 30$  mag), by the time these observations are made during Cycle 19. Our interest here is in better characterizing the progenitor star.

The observations consist of 4 individual exposures, two each through the F435W and F814W filters. The two exposures in each filter are dithered by 2 pixels in x and 2 pixels in y along the direction that minimizes the effects of scale variation across the detector to enable post-processing elimination of both hot pixels and cosmic ray hits. Accounting for overheads, this permits four observations of 545 seconds each to be made. (This is according to the Astronomer's Proposal Tool; if additional time is available to observe, please extend the observations accordingly.)

The observing sequence thus proceeds as follows:

Exposure 1, F435W

Dither

Exposure 2, F435W

Repoint to original location

Exposure 3, F814W

Dither

Exposure 4, F814W

We have opted for the WFC1-CTE aperture, which places the target 200 x 200 pixels from the upper corner of the chip, to minimize CTE losses during readout. However, since we will be registering these new images with the archival ones, we desire a somewhat larger available region around the target location (to provide a sufficient number of stars, surrounding the target location) than the nominal placement provides. Thus, we have offset the target location on the chip by -300 x -300 pixels (-15 x -15 arcsec) to place the final target location 500 x 500 pixels from the corner of the

chip. This provides a sufficient area for the registration, while at the same time minimizing CTE losses.

<b>Visit</b>	<b>Proposal 12574, Visit 01</b>		
	<b>Diagnostic Status: No Diagnostics</b>		
	Scientific Instruments: ACS/WFC		
	Special Requirements: (none)		

<b>Patterns</b>	#	Primary Pattern	Secondary Pattern	Exposures
	(1)	Pattern Type=ACS-WFC-DITHER-LINE Purpose=DITHER Number Of Points=2 Point Spacing=0.145 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=47.23 Angle Between Sides= Center Pattern=false	

<b>Fixed Targets</b>	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SN-2006OV	RA: 12 21 55.3000 (185.4804167d) Dec: +04 29 16.70 (4.48797d) Equinox: J2000		V=30	Reference Frame: NED

*Comments: This object was generated by the targetselector and retrieved from the SIMBAD database. Note that the supernova itself will \*not\* be visible on the frames, as it has faded well below detectability (Vmag ~30).*

<b>Exposures</b>	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
	1	(1) SN-2006OV	ACS/WFC, ACCUM, WFC1-CTE	F435W	POS TARG -15,-15	Pattern 1, Exps 1-1 in Visit 01 (1)	545 Secs		[1]	
2	(1) SN-2006OV	ACS/WFC, ACCUM, WFC1-CTE	F814W	POS TARG -15,-15	Pattern 1, Exps 2-2 in Visit 01 (1)	545 Secs		[1]		

