



15818 - The Center of Expansion and Age of Supernova Remnant N132D

Cycle: 27, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Dan Milisavljevic (PI) (Contact)	Purdue University	dmilisav@purdue.edu
Mr. Charles Law (CoI)	Harvard University	charles.law@cfa.harvard.edu
Dr. Paul P. Plucinsky (CoI)	Smithsonian Institution Astrophysical Observatory	plucinsky@cfa.harvard.edu
Dr. Daniel J. Patnaude (CoI)	Smithsonian Institution Astrophysical Observatory	dpatnaude@cfa.harvard.edu
Mr. John Banovetz (CoI)	Purdue University	jbanovet@purdue.edu
Dr. Niharika Sravan (CoI)	Purdue University	niharika.sravan@gmail.com

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) SNR-J052501-693842	ACS/WFC WFC3/IR	3	05-Nov-2019 12:00:14.0	yes

3 Total Orbits Used

ABSTRACT

Supernovae are among the most powerful and influential explosions in the universe. They are also ideal multi-messenger laboratories to study extreme astrophysics. However, many fundamental properties of supernovae related to their diverse progenitor systems and explosion mechanisms remain poorly constrained, particularly with regard to why and how asymmetry is introduced during core collapse.

Young, nearby supernova remnants offer valuable opportunities to investigate these issues in finely resolved detail. A critical parameter in characterizing the explosion dynamics of a supernova remnant is an accurate measurement of its center of expansion and an estimate of its explosion

Proposal 15818 (STScI Edit Number: 0, Created: Tuesday, November 5, 2019 at 12:00:15 PM Eastern Standard Time) - Overview
age via proper motion of its fast ejecta. In many cases HST has been uniquely capable in providing the observations required to constrain these parameters for, e.g., Cassiopeia A and 1E 0102.2-7219.

Here we request three orbits of HST time to investigate the young, oxygen-rich supernova remnant N132D in a similar manner. These observations will fulfill the need for a comprehensive measurement of proper motion of its ejecta around the entire remnant. They will also complement an approved Chandra Legacy 900 ks observation and a recently developed high resolution 3D reconstruction of the remnant.

OBSERVING DESCRIPTION

This program will obtain new ACS Wide Field Camera images of the supernova remnant N132D in the LMC using the F475W and F502N filters. We require deep exposures sensitive to faint emission from the [O III] 4959, 5007 lines. Our data will be compared to archival images obtained in programs 12001 (ACS/WCS/F475W) and 5365 (WFPC2/PC/F502N) to measure proper motion in the ejecta. The remnant is 2.5 arcminutes in diameter so we must center it between the chip gaps. We have placed constraints on roll angle to minimize geometric distortion across the images across epochs.

This program also obtains new WFC3/IR/F164N images. No prior images exist in this filter. We are looking to map [Si I] and [Fe II] emission around 1.64 microns. Our observing strategy is optimally configured to detect faint, diffuse emission in one orbit.

Proposal 15818 - Visit 01 - The Center of Expansion and Age of Supernova Remnant N132D

Tue Nov 05 17:00:15 GMT 2019

Visit	Proposal 15818, Visit 01, implementation Diagnostic Status: No Diagnostics Scientific Instruments: WFC3/IR, ACS/WFC Special Requirements: ORIENT 25D TO 65 D; ORIENT 205D TO 245 D									
	#	Primary Pattern	Secondary Pattern	Exposures						
Patterns	(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=6.5 Line Spacing=6.5 Coordinate Frame=POS-TARG Pattern Orientation=18.39 Angle Between Sides=68.14 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)						
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous				
	(1)	SNR-J052501-693842	RA: 05 25 2.3531 (81.2598046d) Dec: -69 38 27.40 (-69.64094d) Equinox: J2000	Epoch of Position: 2015.5	V=21	Reference Frame: SIMBAD				
<i>Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.</i> Category=EXT-MEDIUM Description=[SNR]										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SNR-J052501-693842	ACS/WFC, ACCUM, WFCENTER	F475W				Pattern 1, Exps 1-2 in Visit 01 (1)	580 Secs (2320 Secs)
									[==>(Pattern 1)]	[1]
									[==>(Pattern 2)]	
									[==>(Pattern 3)]	[2]
									[==>(Pattern 4)]	
2		(1) SNR-J052501-693842	ACS/WFC, ACCUM, WFCENTER	F502N		FLASH=15		Pattern 1, Exps 1-2 in Visit 01 (1)	620 Secs (2480 Secs)	
									[==>620.0 Secs (Pattern 1)]	[1]
									[==>620.0 Secs (Pattern 2)]	
									[==>620.0 Secs (Pattern 3)]	[2]
									[==>620.0 Secs (Pattern 4)]	
3		(1) SNR-J052501-693842	WFC3/IR, MULTIACCUM, IR-FIX	F164N		SAMP-SEQ=SPARS 200;		Pattern 2, Exps 3-3 in Visit 01 (2)	1402.93276 Secs (2805.866 Secs)	
						NSAMP=8			[==>(Pattern 1)]	[3]
									[==>(Pattern 2)]	

