12983 - The active pair-instability supernova PTF10nmn: late-time photometry, host properties and precise localization.

Cycle: 20, 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) PTF10NMN	ACS/WFC	2	30-Aug-2012 21:35:32.0	yes

2 Total Orbits Used

ABSTRACT

Pair-instability supernovae (PISN) may be the brightest and most energetic explosions in the Universe, arising from the most massive stars. However, they are rare! Only a single promising candidate has been published to date (SN 2007bi; Gal-Yam et al. 2009, Nature, 462, 624). During the last two years we have been monitoring a second good candidate, discovered by the Palomar Transient Factory - PTF10nmn, whose observed features (both light curve and spectra) closely resemble those of SN 2007bi. The SN, at redshift z=0.123, is now more than 1.5 years after peak brightness, but became nebular only around 100 days ago and is still visible; its late-time emission powered by the huge synthesized 56Ni mass and slowly declining. We propose to obtain accurate late-time photometry of the SN in order to measure the late-time decay rate and constrain the relevant

physics (continued decline following the 56Co rate vs. possible contribution from late CSM interaction). We will acquire accurate photometry of the dwarf host galaxy (an important clue to the origin of these explosions) and determine the exact location of the SN within its host. This should serve future studies (after the SN light has completely disappeared) that will be able to unveil in detail the immediate surrounding of this SN, and test recent theoretical work concerning the nature of PISNe at low redshift galaxies.

OBSERVING DESCRIPTION

Two orbits imaging using ACS/WFC with optical band F625W.

REAL TIME JUSTIFICATION

Scheduling requirement: We stress again that due to the fact that our target is already 2 years post maximum light and is fading away, and because a major goal is to obtain a precise localization within the host, we have requested that the observations will take place as early as possible within the cycle. This constraint has been reviewed and approved by the panel, and it would be of tremendous value if this observation is indeed scheduled to the very beginning (1st month) of the cycle!

Visit

Proposal 12983, Visit 01 (01), implementation Fri Aug 31 01:35:41 GMT 2012

Diagnostic Status: No Diagnostics

Scientific Instruments: ACS/WFC

Special Requirements: BEFORE 15-OCT-2012

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=ACS-WFC-DITHER-BOX Purpose=DITHER Number Of Points=4 Point Spacing=0.265 Line Spacing=0.187	Coordinate Frame=POS-TARG Pattern Orientation=20.67 Angle Between Sides=69.05 Center Pattern=true		(1), (2)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	PTF10NMN	RA: 15 50 2.7900 (237.5116250d) Dec: -07 24 42.10 (-7.41169d) Equinox: J2000		V=25.0+/-0.5	Reference Frame: ICRS

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time/[Actual Dur.]	Orbit
1	550sec_exp	(1) PTF10NMN	ACS/WFC, ACCUM, WFC1-CTE	F625W		GS ACQ SCENARIO BASE1B3	Pattern 1, Exps 1-1 in Visit 01 (01) (1)	550 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[1]***
2	599sec_exp	(1) PTF10NMN	ACS/WFC, ACCUM, WFC1-CTE	F625W			Pattern 1, Exps 2-2 in Visit 01 (01) (1)	599 Secs	
								[==>(Pattern 1)] *[==>(Pattern 2)]* *[==>(Pattern 3)]* *[==>(Pattern 4)]*	***[2]***

Orbit Structure