



15853 - Did SN 2017ein Arise From A Very Massive Star?

Cycle: 27, 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) SN2017EIN	WFC3/UVIS	1	14-Aug-2019 16:09:42.0	yes

1 Total Orbits Used

ABSTRACT

SN 2017ein in NGC 3938 represents the first-ever case in which a credible progenitor candidate has been identified for a Type Ic supernova, after nearly two decades of searching for such progenitors. The candidate was isolated in pre-explosion archival HST WFPC2 imaging of the host galaxy from 2007. Although the host galaxy distance and line-of-sight extinction to the progenitor candidate are not known well, the evidence points to the candidate being very blue, and therefore hot, and also quite luminous. The inference from these properties is that the progenitor would have to be

very massive, at >45 solar masses, whether a single star or a member of a binary system. Such a high mass is a conundrum, given that the supernova ejecta mass inferred from observations of the otherwise-normal SN 2017ein is about 1 solar mass, more consistent with expectations if the progenitor were of significantly lower mass. Alternative explanations include that the candidate is a blue compact stellar cluster, of which the progenitor may have been a member, or that the progenitor had no physical connection whatsoever to the candidate, but was just situated within its PSF. We propose to reimage the SN site with WFC3/UVIS to determine whether the candidate has vanished completely, indicating that it was the actual progenitor, which would be astounding and potentially game-changing; or, whether the candidate persists, either unchanged in brightness or dimmed somewhat from its pre-SN state due to the demise of the real, unseen progenitor. SN 2017ein should have faded sufficiently by Cycle 27. The SN 2017ein progenitor candidate is currently the most intriguing and compelling such object for study.

OBSERVING DESCRIPTION

We will image the site of SN 2017ein with WFC3/UVIS in band F336W in one orbit. We will split the total exposure time into 3 line-dithered frames of 875 sec each. The frame pointing is offset some from the nominal SN position. Reduced gyro operations should have minimal effect.

Proposal 15853 - Visit 01 - Did SN 2017ein Arise From A Very Massive Star?

Wed Aug 14 20:09:43 GMT 2019

Visit	Proposal 15853, Visit 01, implementation		
	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	

Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
	(1)	SN2017EIN	RA: 11 52 59.0530 (178.2460542d) Dec: +44 06 18.63 (44.10518d) Equinox: J2000	Epoch of Position: 2000.0	V=34+/-1	Reference Frame: SIMBAD

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
 Category=STAR
 Description=[SUPERNOVA]

Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1		(1) SN2017EIN	WFC3/UVIS, ACCUM, UVIS	F336W	FLASH=9			Pattern 1, Exps 1-1 in Visit 01 (1)	875 Secs (2625 Secs)

[=>(Pattern 1)]
 [=>(Pattern 2)]
 [=>(Pattern 3)]

