17611 - Measuring the Hubble constant with the next multiple-imaged lensed supernova

Cycle: 31, Proposal Category: GO

(Availability Mode: SUPPORTED)

INVESTIGATORS

Name	***Institution***
Prof. Ariel Goobar (PI) (ESA Member) (Contact)	**Stockholm University**
Dr. Nikki Arendse (CoI) (ESA Member)	Stockholm University
Dr. Suhail Dhawan (CoI) (ESA Member)	University of Cambridge
Prof. Edvard Mortsell (CoI) (ESA Member)	Stockholm University
Dr. Joel Pearson Johansson (CoI) (ESA Member)	Stockholm University
Dr. Lin Yan (CoI)	California Institute of Technology
Dr. Jakob Nordin (CoI) (ESA Member)	Humboldt Universitat zu Berlin
Ana Sagues Carracedo (CoI) (ESA Member)	Stockholm University
Dr. Christoffer Fremling (CoI)	California Institute of Technology
Dr. Mickael Rigault (CoI) (ESA Member)	Institut des deux Infinis de Lyon
Dr. Mathew Smith (CoI) (ESA Member)	Institut des deux Infinis de Lyon
Dr. Angela Adamo (CoI) (ESA Member)	Stockholm University
Dr. Adelaide Marie Claeyssens (CoI) (ESA Member)	Centre de Recherche Astrophysique de Lyon
Dr. T. Emil Rivera-Thorsen (CoI) (ESA Member)	Stockholm University
Ms. Alice Townsend (CoI) (ESA Member)	Humboldt Universitat zu Berlin
Dr. Stephen Thorp (CoI) (ESA Member)	Stockholm University
Mr. William D'Arcy Kenworthy (CoI) (ESA Member)	Stockholm University
Igor Andreoni (CoI)	University of North Carolina at Chapel Hill
Dr. Peter E. Nugent (CoI) (AdminUSPI)	Lawrence Berkeley National Laboratory
Dr. Thomas E. Collett (CoI) (ESA Member)	University of Portsmouth

Name	*Institution*
Prof. Graham Smith (CoI) (ESA Member)	University of Birmingham

VISITS

Visit	*Targets used in Visit*	*Configurations used in Visit*	*Orbits Used*	*Last Orbit Planner Run*	*OP Current with Visit?*
01	(2) AT2025WNY	WFC3/IR WFC3/UVIS	1	22-Oct-2025 09:00:15.0	yes
02	(2) AT2025WNY	WFC3/IR WFC3/UVIS	1	22-Oct-2025 09:00:16.0	yes

2 Total Orbits Used

ABSTRACT

Spectroscopic time-delay measurements of multiply-imaged supernovae offer a very efficient way to measure the expansion rate of the universe. NIRCam and NIRSpec follow-up observations with JWST upon the next lensed supernova (SN) discovered by the Zwicky Transient Facility (ZTF) or the La Silla Schmidt Southern Survey (LS4) could pave the way for a novel technique to measure the Hubble constant and adress the "Hubble tension". Unlike any other time-delay measurement, spectroscopic dating of multiple SN images can be done without repeated observations. We propose to select a suitable lensed supernova for ToO observations and anticipate a 5% (or better) measurement of H0, with only 3.5 hours of JWST time.

OBSERVING DESCRIPTION

Target of opportunity imaging observations of a confirmed lensed SN. Three optical filters and one NIR.

Visit

Proposal 17611, Epoch 1 (01), completed Wed Oct 22 13:00:16 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: SCHED 100%; ON HOLD ; TOO RESPONSE TIME 21.0D

On Hold Comments: This is a generic target in ToO mode

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.305 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(4)
(2)	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)

Fixed Targets

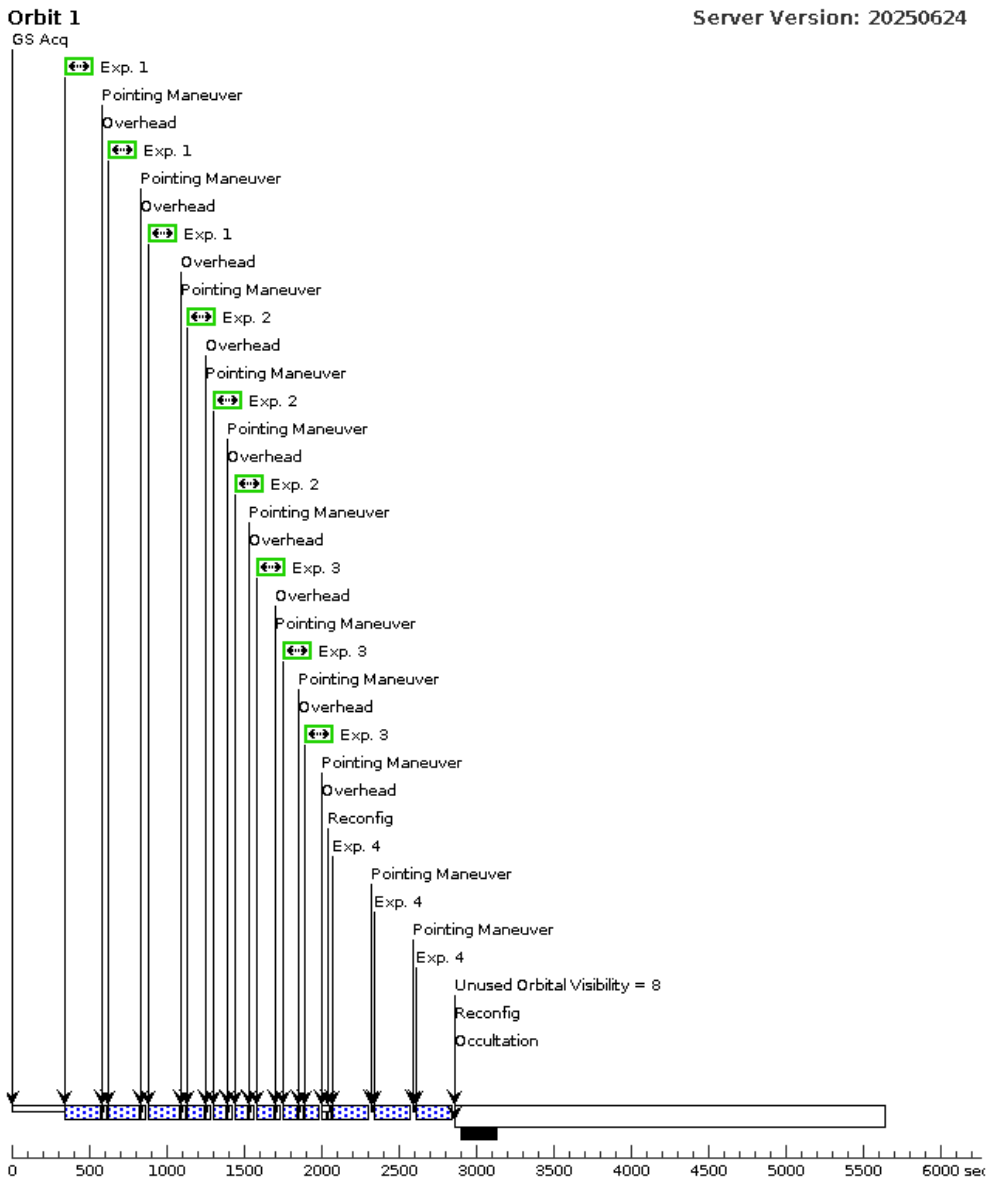
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	AT2025WNY Alt Name1: ZTF25ABNJZNP	RA: 07 16 34.5000 (109.1437500d) Dec: +38 21 7.76 (38.35216d) Equinox: J2000	Epoch of Position: 2000	V=20 +/-0.5	Reference Frame: ICRS

Comments: Transient in the ZTF survey in a known galaxy-scale lensing candidate system (lens at z=0.3754) . Liverpool telescope images from Oct 3 and 4 revelaled two additional fainter images, indicating the lensing nature of the transient.
Category=STAR
Description=[GRAVITATIONAL LENS, SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F475W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F475W	FLASH=14		Pattern 2, Exps 1-1 in Epoch 1 (01) (2)	42 Secs (591 Secs) *[==>197.0 Secs (Pattern 1)]* *[==>197.0 Secs (Pattern 2)]* *[==>197.0 Secs (Pattern 3)]*	***[1]***
2	F625W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F625W	FLASH=14		Pattern 2, Exps 2-2 in Epoch 1 (01) (2)	13 Secs (252 Secs) *[==>84.0 Secs (Pattern 1)]* *[==>84.0 Secs (Pattern 2)]* *[==>84.0 Secs (Pattern 3)]*	***[1]***
3	F814W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F814W	FLASH=14		Pattern 2, Exps 3-3 in Epoch 1 (01) (2)	20 Secs (273 Secs) *[==>91.0 Secs (Pattern 1)]* *[==>91.0 Secs (Pattern 2)]* *[==>91.0 Secs (Pattern 3)]*	***[1]***
4	F160W	(2) AT2025WNY	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=10; SAMP-SEQ=SPARS25	POS TARG null,10	Pattern 1, Exps 4-4 in Epoch 1 (01) (1)	207.144286 Secs (621.433 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***

Orbit Structure



Visit

Proposal 17611, Epoch 2 (02), scheduling Wed Oct 22 13:00:17 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR, WFC3/UVIS

Special Requirements: SCHED 100%; AFTER 01 BY 40 D TO 53 D; ON HOLD ; TOO RESPONSE TIME 21.0D

On Hold Comments: This is a generic target in ToO mode

Patterns

#	Primary Pattern		Secondary Pattern	Exposures
(1)	Pattern Type=WFC3-IR-DITHER-LINE-3PT Purpose=DITHER Number Of Points=3 Point Spacing=1.305 Line Spacing=	Coordinate Frame=POS-TARG Pattern Orientation=41.788 Angle Between Sides= Center Pattern=false		(4)
(2)	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)

Fixed Targets

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(2)	AT2025WNY Alt Name1: ZTF25ABNJZNP	RA: 07 16 34.5000 (109.1437500d) Dec: +38 21 7.76 (38.35216d) Equinox: J2000	Epoch of Position: 2000	V=20 +/-0.5	Reference Frame: ICRS

Comments: Transient in the ZTF survey in a known galaxy-scale lensing candidate system (lens at z=0.3754) . Liverpool telescope images from Oct 3 and 4 revelaled two additional fainter images, indicating the lensing nature of the transient.
Category=STAR
Description=[GRAVITATIONAL LENS, SUPERNOVA]

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F475W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F475W	FLASH=14		Pattern 2, Exps 1-1 in Epoch 2 (02) (2)	42 Secs (591 Secs) *[==>197.0 Secs (Pattern 1)]* *[==>197.0 Secs (Pattern 2)]* *[==>197.0 Secs (Pattern 3)]*	***[1]***
2	F625W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F625W	FLASH=14		Pattern 2, Exps 2-2 in Epoch 2 (02) (2)	13 Secs (252 Secs) *[==>84.0 Secs (Pattern 1)]* *[==>84.0 Secs (Pattern 2)]* *[==>84.0 Secs (Pattern 3)]*	***[1]***
3	F814W	(2) AT2025WNY	WFC3/UVIS, ACCUM, UVIS2-C512C-SUB	F814W	FLASH=14		Pattern 2, Exps 3-3 in Epoch 2 (02) (2)	20 Secs (273 Secs) *[==>91.0 Secs (Pattern 1)]* *[==>91.0 Secs (Pattern 2)]* *[==>91.0 Secs (Pattern 3)]*	***[1]***
4	F160W	(2) AT2025WNY	WFC3/IR, MULTIACCUM, IRSUB512	F160W	NSAMP=10; SAMP-SEQ=SPARS25	POS TARG null,10	Pattern 1, Exps 4-4 in Epoch 2 (02) (1)	207.144286 Secs (621.433 Secs) *[==>(Pattern 1)]* *[==>(Pattern 2)]* *[==>(Pattern 3)]*	***[1]***

Orbit Structure