



17263 - Catching the accretion burst of a massive protostar on the rise with the HST

Cycle: 30, Proposal Category: GO/DD

(Availability Mode: SUPPORTED)

INVESTIGATORS

<i>Name</i>	<i>Institution</i>	<i>E-Mail</i>
Dr. Ruben Fedriani (PI) (ESA Member) (Contact)	Chalmers University of Technology	ruben.fedriani@chalmers.se
Dr. Alessio Caratti o Garatti (CoI) (ESA Member)	Dublin Institute For Advanced Studies	alessio@cp.dias.ie
Dr. Fabrizio Massi (CoI) (ESA Member)	INAF - Osservatorio Astrofisico di Arcetri	fabrizio.massi@inaf.it
Dr. Riccardo Cesaroni (CoI) (ESA Member)	Osservatorio Astrofisico di Arcetri	cesa@arcetri.astro.it
Dr. Jochen Eisloffel (CoI) (ESA Member)	Thuringer Landessternwarte Tautenburg (TLS)	jochen@tls-tautenburg.de
Dr. Bringfried Stecklum (CoI) (ESA Member)	Thuringer Landessternwarte Tautenburg (TLS)	stecklum@tls-tautenburg.de

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) MOL77	WFC3/IR	1	15-Nov-2022 09:01:31.0	yes
51	(1) MOL77	WFC3/IR	1	15-Nov-2022 09:01:32.0	yes
02	(1) MOL77	WFC3/IR	1	15-Nov-2022 09:01:33.0	yes

3 Total Orbits Used

ABSTRACT

A wealth of new theoretical and observational evidence supports now the idea that episodic accretion is a fundamental and common phenomenon across mass and time in star formation. In particular, the most recent discovery and follow-up of three accretion bursts from high mass young stellar objects (HMYSOs) have been key to link low- and high-mass star-formation mechanisms to the common ground of disk-mediated accretion. Among those, only one (S255IR NIRS 3) could be detected and studied at NIR wavelengths, just after the burst maximum. A new accretion burst from

Proposal 17263 (STScI Edit Number: 1, Created: Tuesday, November 15, 2022 at 9:01:33 AM Eastern Standard Time) - Overview

Mol77, a 10 Msun protostar, begun in the first week of October 2022. This provides us with the unique chance to study such rare events from an early stage. We request HST/WFC3 observations to map the source and its outflow cavity to confirm the burst in the infrared. We will also derive the pre-burst spectrum of Mol77, as the cavity walls still see the pre-outburst phase. Finally, we will for the first time measure the light echo with the HST for a HMYSO.

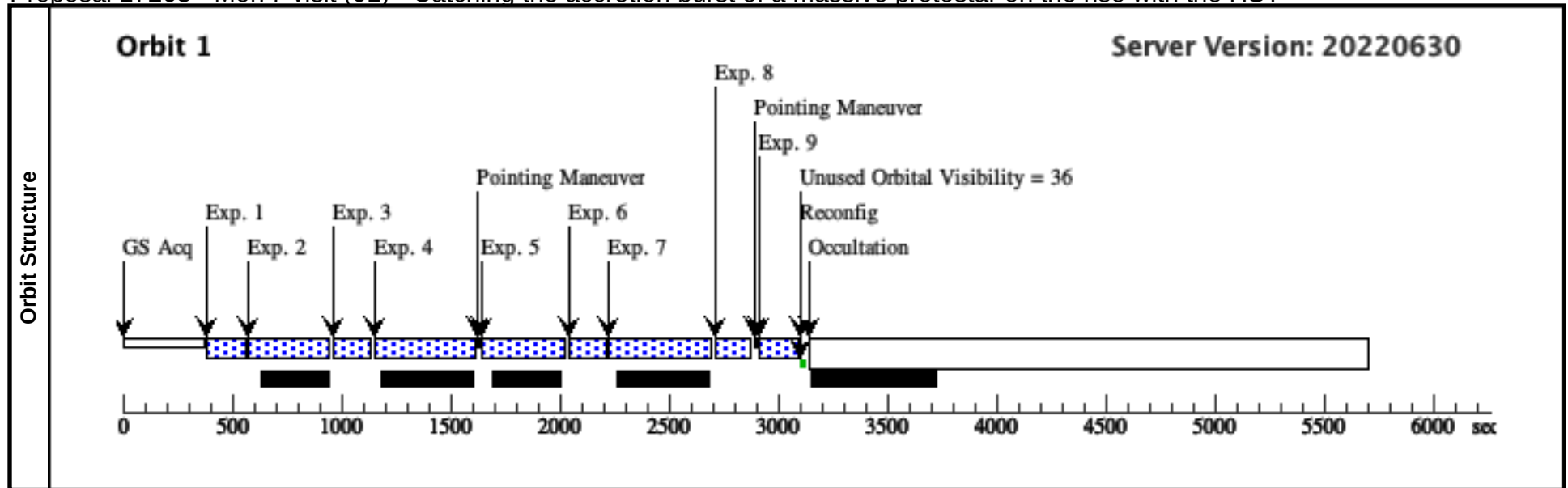
OBSERVING DESCRIPTION

This program will observe the outbursting high-mass young stellar object Mol77 in two epochs. We aim at observing the light echo from the burst and therefore we want the two epochs as separated as possible within the observability window. Each epoch will be observed with one orbit. Therefore the total length of the programme is two orbits.

Each orbit will observe four filters, namely F110W and F160W for broad-band filters and F128N and F164N for narrow-band filters.

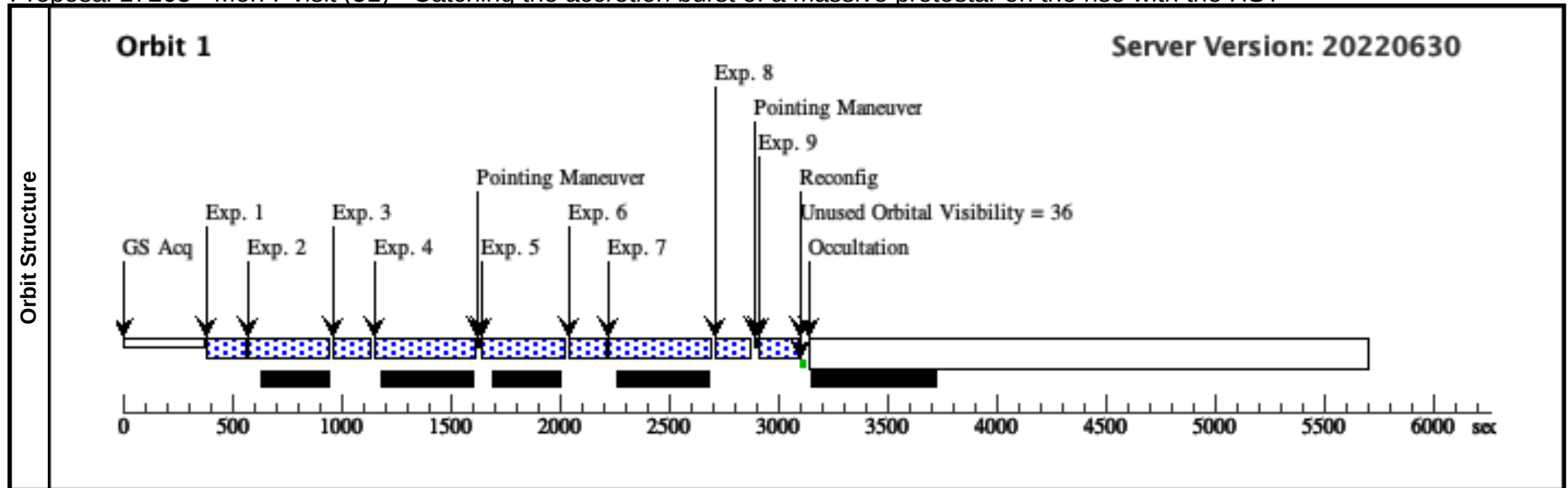
Proposal 17263 - Mol77 visit (01) - Catching the accretion burst of a massive protostar on the rise with the HST

Visit	Proposal 17263, Mol77 visit (01), failed										Tue Nov 15 14:01:33 GMT 2022
	Diagnostic Status: No Diagnostics										
	Scientific Instruments: WFC3/IR										
	Special Requirements: (none)										
Comments: This is the first epoch of the programme and should be executed as soon as possible											
Fixed Targets	#	Name	Target Coordinates		Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	MOL77	RA: 18 55 16.5000 (283.8187500d) Dec: +03 05 7.00 (3.08528d) Equinox: J2000		Epoch of Position: 2015.5		V=25 J=15.8;H=14		Reference Frame: ICRS		
	Comments: The NIR counterpart source is 2MASS 18551666+0305079										
	Category=STAR Description=[EJECTA, JET, KNOT, PRE-MAIN SEQUENCE STAR, YSO] Extended=YES										
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit
	1	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 0,0		149.231128 Secs (149.231 Secs) [==>]		[1]
	2	F128N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP5 0	POS TARG 0,0		349.232932 Secs (349.233 Secs) [==>]		[1]
	3	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 0,0		149.231128 Secs (149.231 Secs) [==>]		[1]
	4	F164N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 0,0		449.233834 Secs (449.234 Secs) [==>]		[1]
	5	F128N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP5 0	POS TARG 1,1		349.232932 Secs (349.233 Secs) [==>]		[1]
	6	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 1,1		149.231128 Secs (149.231 Secs) [==>]		[1]
	7	F164N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 1,1		449.233834 Secs (449.234 Secs) [==>]		[1]
	8	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 1,1		149.231128 Secs (149.231 Secs) [==>]		[1]
	9	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG -1,-1		149.231128 Secs (149.231 Secs) [==>]		[1]



Proposal 17263 - Mol77 visit (51) - Catching the accretion burst of a massive protostar on the rise with the HST

Visit	Proposal 17263, Mol77 visit (51)										Tue Nov 15 14:01:34 GMT 2022	
	Diagnostic Status: No Diagnostics											
	Scientific Instruments: WFC3/IR											
	Special Requirements: (none)											
	Comments: This is the first epoch of the programme and should be executed as soon as possible											
HOPR repeat of visit 01.												
Fixed Targets	#	Name	Target Coordinates			Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	MOL77	RA: 18 55 16.5000 (283.8187500d)			Epoch of Position: 2015.5		V=25		Reference Frame: ICRS		
			Dec: +03 05 7.00 (3.08528d)					J=15.8;H=14				
			Equinox: J2000									
	Comments: The NIR counterpart source is 2MASS 18551666+0305079											
Category=STAR												
Description=[EJECTA, JET, KNOT, PRE-MAIN SEQUENCE STAR, YSO]												
Extended=YES												
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]		Orbit	
	1	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8;	POS TARG 0,0		149.231128 Secs (149.231 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
	2	F128N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12;	POS TARG 0,0		349.232932 Secs (349.233 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
	3	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8;	POS TARG 0,0		149.231128 Secs (149.231 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
	4	F164N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14;	POS TARG 0,0		449.233834 Secs (449.234 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
	5	F128N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12;	POS TARG 1,1		349.232932 Secs (349.233 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
	6	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8;	POS TARG 1,1		149.231128 Secs (149.231 Secs)			
						SAMP-SEQ=STEP5			[==>]		[1]	
7	F164N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14;	POS TARG 1,1		449.233834 Secs (449.234 Secs)				
					SAMP-SEQ=STEP5			[==>]		[1]		
8	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8;	POS TARG 1,1		149.231128 Secs (149.231 Secs)				
					SAMP-SEQ=STEP5			[==>]		[1]		
9	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8;	POS TARG -1,-1		149.231128 Secs (149.231 Secs)				
					SAMP-SEQ=STEP5			[==>]		[1]		



Proposal 17263 - Mol77 visit (02) - Catching the accretion burst of a massive protostar on the rise with the HST

Visit	Proposal 17263, Mol77 visit (02), scheduled								Tue Nov 15 14:01:34 GMT 2022	
	Diagnostic Status: No Diagnostics									
	Scientific Instruments: WFC3/IR									
	Special Requirements: (none)									
	Comments: This is the second epoch of the programme and should be executed as far apart as possible with respecto to the epoch one (visit 01)									
Fixed Targets	#	Name	Target Coordinates	Targ. Coord. Corrections		Fluxes		Miscellaneous		
	(1)	MOL77	RA: 18 55 16.5000 (283.8187500d) Dec: +03 05 7.00 (3.08528d) Equinox: J2000	Epoch of Position: 2015.5		V=25 J=15.8;H=14		Reference Frame: ICRS		
	Comments: The NIR counterpart source is 2MASS 18551666+0305079									
	Category=STAR									
	Description=[EJECTA, JET, KNOT, PRE-MAIN SEQUENCE STAR, YSO] Extended=YES									
Exposures	#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
	1	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 0,0		149.231128 Secs (149.231 Secs) [==>]	[1]
	2	F128N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP5 0	POS TARG 0,0		349.232932 Secs (349.233 Secs) [==>]	[1]
	3	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 0,0		149.231128 Secs (149.231 Secs) [==>]	[1]
	4	F164N-a	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 0,0		449.233834 Secs (449.234 Secs) [==>]	[1]
	5	F128N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP5 0	POS TARG 1,1		349.232932 Secs (349.233 Secs) [==>]	[1]
	6	F110W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 1,1		149.231128 Secs (149.231 Secs) [==>]	[1]
	7	F164N-b	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP5 0	POS TARG 1,1		449.233834 Secs (449.234 Secs) [==>]	[1]
	8	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG 1,1		149.231128 Secs (149.231 Secs) [==>]	[1]
	9	F160W	(1) MOL77	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP5 0	POS TARG -1,-1		149.231128 Secs (149.231 Secs) [==>]	[1]

