17928 - Return to Eden: Massive Star Formation in the Time Domain

Cycle: 32, 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) IRAS07299-1651	WFC3/IR	1	16-Jan-2025 17:00:13.0	yes
02	(2) G339.88-1.26	WFC3/IR	1	16-Jan-2025 17:00:14.0	yes
03	(3) G032.03+00.05	WFC3/IR	1	16-Jan-2025 17:00:14.0	yes
04	(4) G028.20-00.05	WFC3/IR	1	16-Jan-2025 17:00:15.0	yes

4 Total Orbits Used

ABSTRACT

Massive stars announce their birth with accretion powered fireworks, piercing powerful jets through their natal clouds. Lower-mass sibling stars dance around the cradle, swirling and sparkling in its deep gravitational well. Here we propose to survey this activity with a return to four massive protostellar systems, first observed by HST WFC3/IR in 2016. Combined with existing archival data, this will then yield a total sample of seven

sources with such two-epoch observations. Protostellar jets are expected to have terminal velocities similar to the escape speed of their launching region from the inner disk near the protostellar surface, which can be greater than 1000 km/s. We will accurately measure the plane of sky speeds and directions of jet knots, especially as traced by [FeII]. These measurements will be combined with ancillary NIR spectroscopic data to yield the most complete kinematic characterization of these massive protostellar outflows, providing powerful diagnostics of the massive star formation process. The flux variability of the jet knots, scattered light from the massive protostar, and from low-mass YSOs will also be studied, delivering crucial measures of outflow and accretion variability. To achieve these science goals requires precise photometric measurements with HST-WFC3/IR for direct comparison with the earlier epoch images.

OBSERVING DESCRIPTION

This program will observe four high-mass young stellar objects driving powerful jets. These observations will be a second epoch where the first epoch observations were taken back in 2016 with exact same instruments and filters. We aim at measuring proper motions from the jet knots driven by the massive protostars as well as to study variability in the field.

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

Visit

Proposal 17928, IRAS07299 visit (01) Thu Jan 16 22:00:16 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

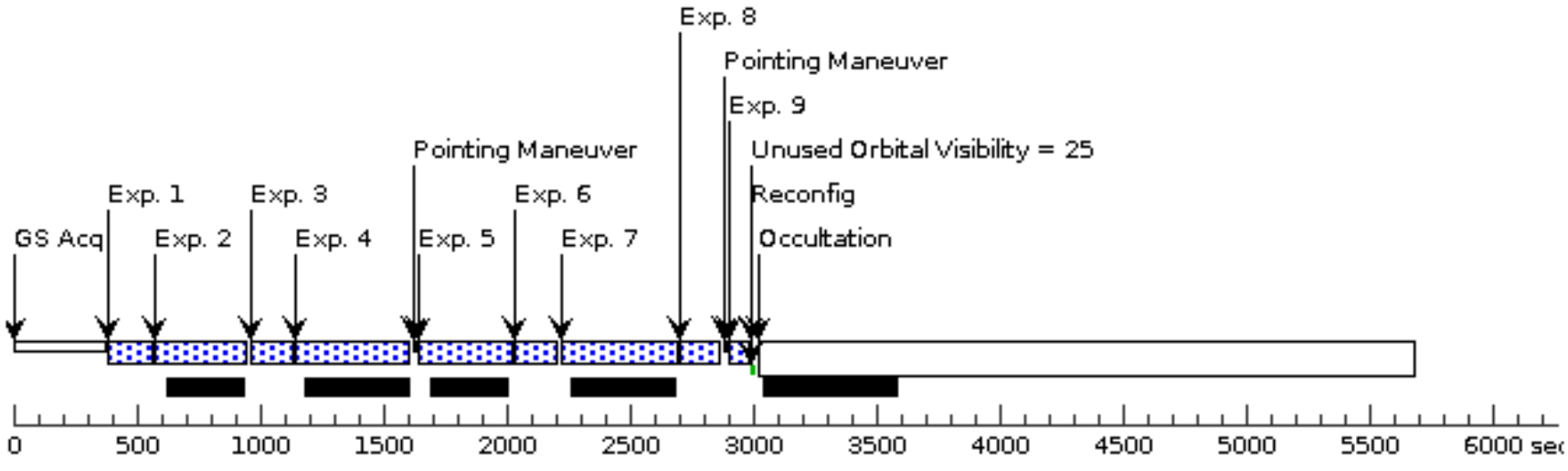
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	IRAS07299-1651	RA: 07 32 7.0000 (113.0291667d) Dec: -16 58 40.00 (-16.97778d) Equinox: J2000	Epoch of Position: 2015.5	V=25 J=13.45;H=10.76	Reference Frame: ICRS

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F110W	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
2	F128N-a	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
4	F164N-a	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0,0		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F128N-b	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
6	F110W	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
7	F164N-b	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
8	F160W	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
9	F160W	(1) IRAS07299-1651	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		49.230226 Secs (49.23 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17928, G339 visit (02) Thu Jan 16 22:00:16 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

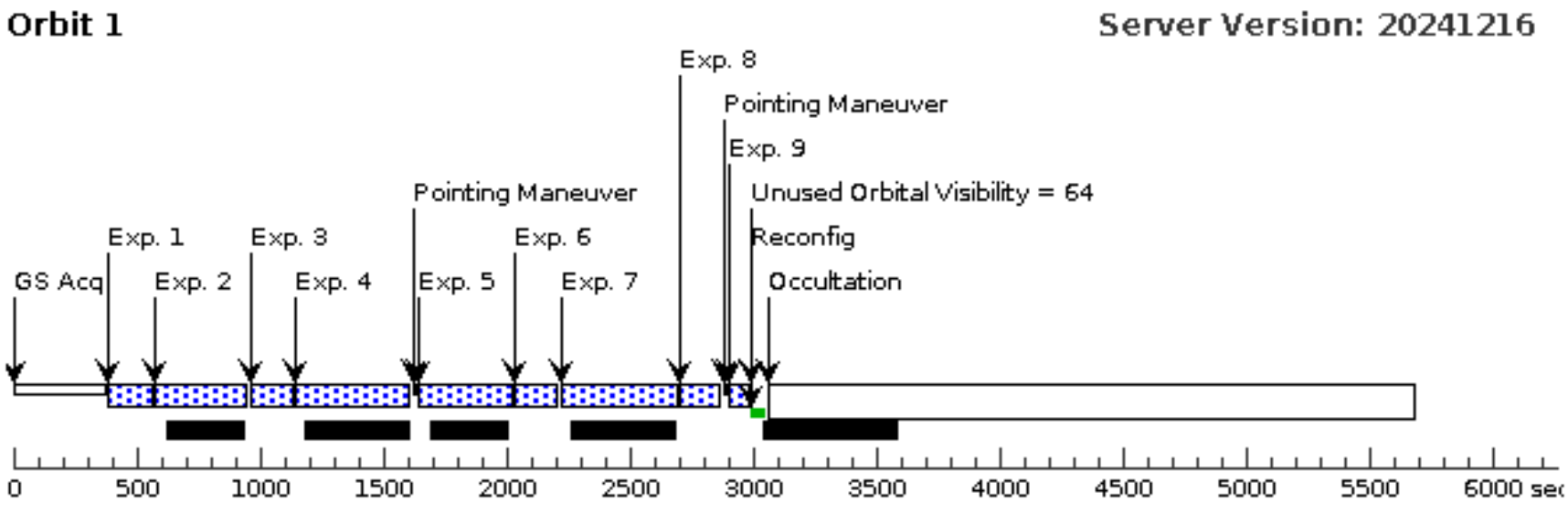
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	G339.88-1.26	RA: 16 52 4.6600 (253.0194167d) Dec: -46 08 34.20 (-46.14283d) Equinox: J2000	Epoch of Position: 2015.5	V=25 J=13.9;H=13.3	Reference Frame: ICRS

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F110W	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
2	F128N-a	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
4	F164N-a	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0,0		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F128N-b	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
6	F110W	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
7	F164N-b	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
8	F160W	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
9	F160W	(2) G339.88-1.26	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		49.230226 Secs (49.23 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17928, G032 visit (03) Thu Jan 16 22:00:16 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

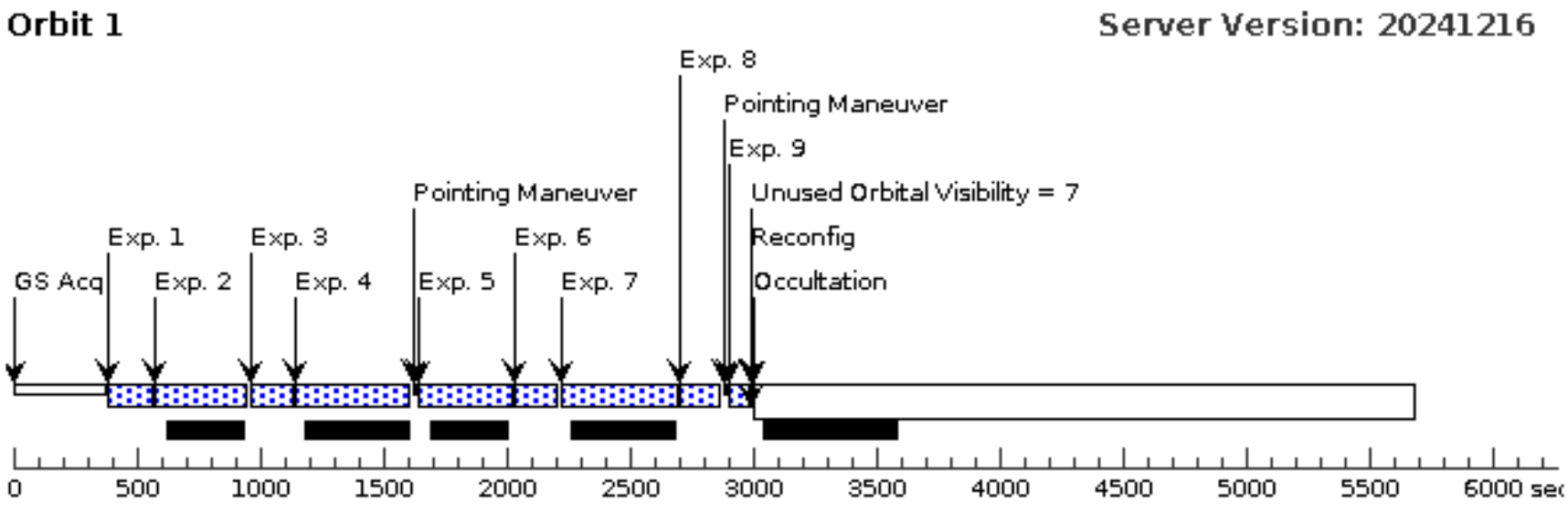
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	G032.03+00.05	RA: 18 49 37.0500 (282.4043750d) Dec: -00 46 50.22 (-.78062d) Equinox: J2000	Epoch of Position: 2015.5	V=(?) J=14.7;H=12.9	Reference Frame: ICRS

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F110W	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
2	F128N-a	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
4	F164N-a	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0,0		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F128N-b	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
6	F110W	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
7	F164N-b	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
8	F160W	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
9	F160W	(3) G032.03+00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		49.230226 Secs (49.23 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17928, G028 visit (04) Thu Jan 16 22:00:16 GMT 2025

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: (none)

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(4)	G028.20-00.05	RA: 18 42 58.1200 (280.7421667d) Dec: -04 13 57.51 (-4.23264d) Equinox: J2000	Epoch of Position: 2015.5	V=(?) J=22.27;H=18.04	Reference Frame: ICRS

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

Exposures

#	Label	Target	Config,Mode,Aperture	Spectral Els.	Opt. Params.	Special Reqs.	Groups	Exp. Time (Total)/[Actual Dur.]	Orbit
1	F110W	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
2	F128N-a	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0,0		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
4	F164N-a	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0,0		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
5	F128N-b	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
6	F110W	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F110W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
7	F164N-b	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F164N	NSAMP=14; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		449.233834 Secs (449.234 Secs) *[==>]*	*[1]*
8	F160W	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.474,0.424		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*
9	F160W	(4) G028.20-00.05	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=6; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		49.230226 Secs (49.23 Secs) *[==>]*	*[1]*

Orbit Structure