17086 - Blowin' in the Wind - Proper Motion Kinematics of Massive Protostellar Outflows

Cycle: 30, 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) G35.2-0.74N	WFC3/IR	1	13-Sep-2022 11:06:12.0	yes
02	(2) AFGL5180	WFC3/IR	1	13-Sep-2022 11:06:13.0	yes
03	(3) IRAS16562-3959	WFC3/IR	1	13-Sep-2022 11:06:14.0	yes

3 Total Orbits Used

ABSTRACT

The answer to the question of how massive stars form may be blowing in the winds that they launch during their main accretion phase. Such winds 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. Here we propose to re-observe three massive protostars that were imaged by HST WFC3/IR in 2016 to measure the expected proper motion of outflow knots, especially as traced by [FeII]. The measurements of the proper motions of these outflow features will be combined with ancillary NIR spectroscopic data to yield the most complete kinematic characterization of the fastest components of massive protostellar outflows. Such data will provide unique and powerful constraints on massive star formation models. This project will also enable proper motion studies of the YSO populations around the massive protostars, i.e., to measure the motion of the protocluster population compared to background field stars and to search for runaway stars. The flux variability of the jet knots, scattered light from the massive protostar, and from low-mass YSOs will also be studied, delivering additional important diagnostics of the outflow and accretion processes.

OBSERVING DESCRIPTION

This program will observe three 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.

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 17086, G35.2-0.74N visit (01), implementation Tue Sep 13 15:06:14 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 271.688004D TO 281.688004 D

Fixed Targets

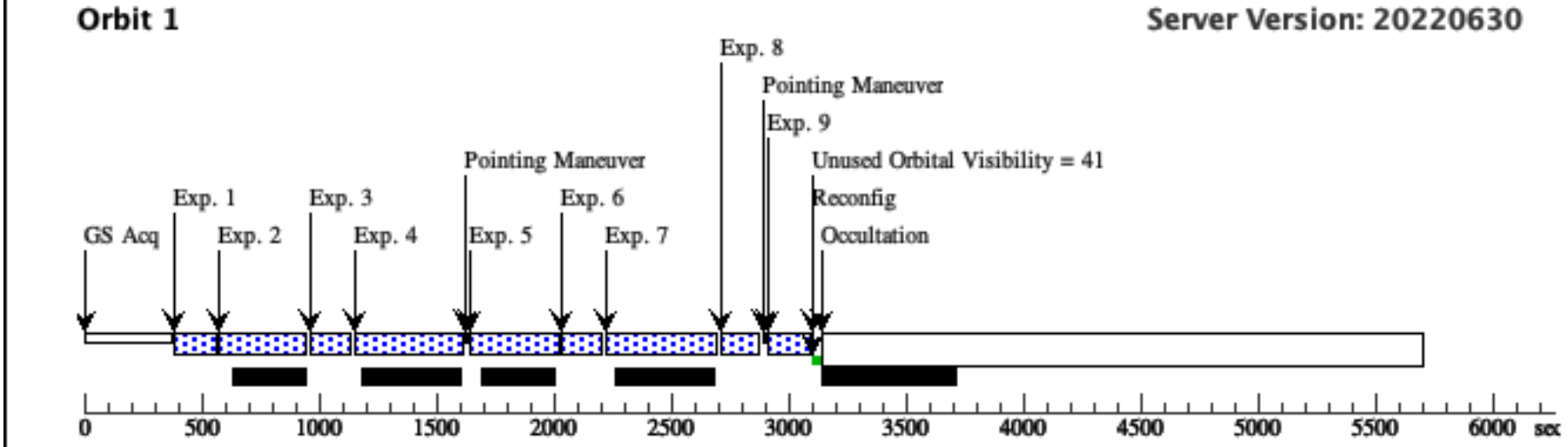
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(1)	G35.2-0.74N	RA: 18 58 13.0300 (284.5542917d) Dec: +01 40 36.14 (1.67671d) Equinox: J2000	Epoch of Position: 2015.5	V=25 J=18.4;H=14.6	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
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) G35.2-0.74N	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) G35.2-0.74N	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(1) G35.2-0.74N	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) G35.2-0.74N	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) G35.2-0.74N	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) G35.2-0.74N	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) G35.2-0.74N	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) G35.2-0.74N	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) G35.2-0.74N	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17086, AFGL5180 visit (02), implementation Tue Sep 13 15:06:14 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 84.487091D TO 94.487091 D

Fixed Targets

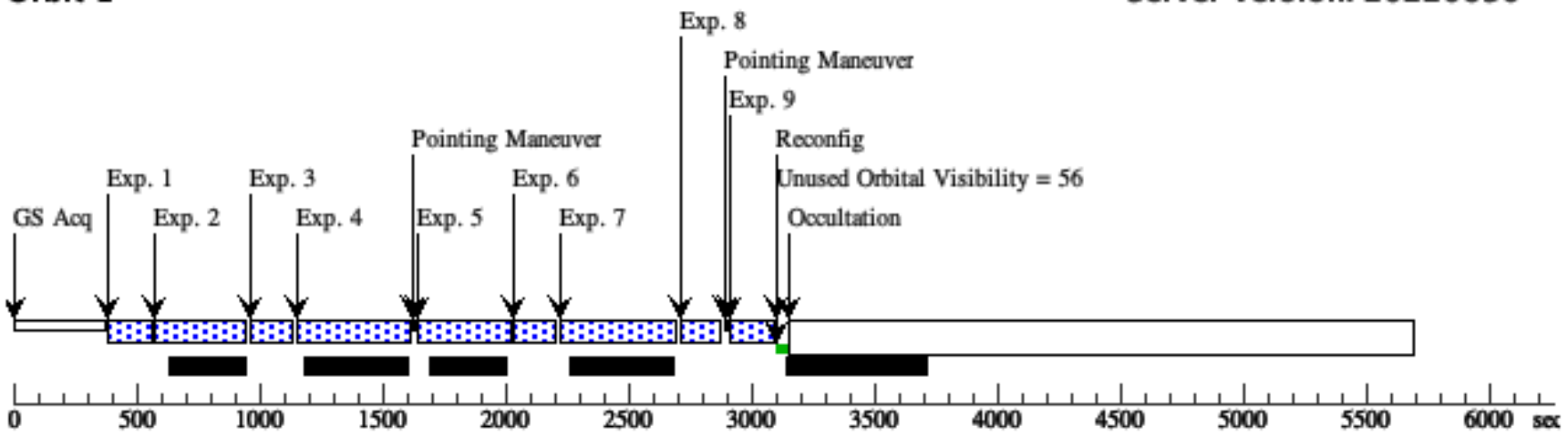
#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(2)	AFGL5180	RA: 06 08 53.3000 (92.2220833d) Dec: +21 38 30.00 (21.64167d) Equinox: J2000	Epoch of Position: 2015.5	V=25 J=15.26;H=12.17	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
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	(2) AFGL5180	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) AFGL5180	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(2) AFGL5180	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) AFGL5180	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) AFGL5180	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) AFGL5180	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) AFGL5180	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) AFGL5180	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) AFGL5180	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*

Orbit Structure



Visit

Proposal 17086, IRAS16562-3959 visit (03), implementation Tue Sep 13 15:06:14 GMT 2022

Diagnostic Status: No Diagnostics

Scientific Instruments: WFC3/IR

Special Requirements: ORIENT 269.634621D TO 279.634621 D

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Fluxes	Miscellaneous
(3)	IRAS16562-3959	RA: 16 59 41.6000 (254.9233333d) Dec: -40 03 44.00 (-40.06222d) Equinox: J2000	Epoch of Position: 2015.5	V=25 J=15.02;H=9.70	Reference Frame: ICRS

Comments: This object was generated by the targetselector and retrieved from the SIMBAD database.
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	(3) IRAS16562-3959	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) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F128N	NSAMP=12; SAMP-SEQ=STEP50	POS TARG 0,0		349.232932 Secs (349.233 Secs) *[==>]*	*[1]*
3	F160W	(3) IRAS16562-3959	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) IRAS16562-3959	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) IRAS16562-3959	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) IRAS16562-3959	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) IRAS16562-3959	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) IRAS16562-3959	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) IRAS16562-3959	WFC3/IR, MULTIACCUM, IR	F160W	NSAMP=8; SAMP-SEQ=STEP50	POS TARG 0.288,0.288		149.231128 Secs (149.231 Secs) *[==>]*	*[1]*

Orbit Structure