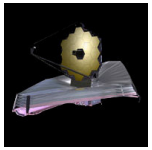

5547 - Spectral catalogue of externally ionized protoplanetary disks in the Orion Nebular Cluster

Cycle: 3, Proposal Category: GO

INVESTIGATORS

Name	*Institution*
Mr. Ciaran Rogers (PI) (ESA Member)	**Universiteit Leiden**
Dr. Olivier Berne (CoI) (ESA Member) (CoPI)	Institut de Recherche en Astrophysique et Planetologie
Dr. Guido De Marchi (CoI) (ESA Member)	European Space Agency - ESTEC
Dr. Ilane Schroetter (CoI) (ESA Member)	Institut de Recherche en Astrophysique et Planetologie

OBSERVATIONS

Folder	*Observation*	*Label*	*Observing Template*	*Science Target*
Orion proplyds NIRSpec MSA				
	3	1228_FINAL_6	NIRSpec MultiObject Spectroscopy	(258) MPT_plan_FINAL

ABSTRACT

Proplyds are young pre-main sequence stars surrounded by a disk of dust and gas, enshrouded in a larger cocoon of material that has been shaped into a characteristic "teardrop" due to the ionizing UV radiation of nearby massive stars. As such, proplyds are ideal targets to investigate the initial conditions of star and planet formation. The objective of this proposal is to provide an unprecedented near infrared spectroscopic survey of about 50 proplyds in the Orion Nebula Cluster (ONC) using the Micro-shutter Assembly of NIRSpec, and to determine in a self consistent way the mass loss rates associated with accretion and photoevaporation. By combining spectra with the available spatially resolved images of each proplyd from the PDRs4ALL ERS program, we will also place tight constraints on parameters related to the morphology, inclination, and distance to the massive stars in the Trapezium cluster. With spectra of proplyds at various distances from Ori Theta 1C, we will be able to investigate in detail how the photoevaporation mass-loss rate scales with distance, and what this implies for survival timescales of protoplanetary disks and planet formation around these stars. This spectroscopic survey will also establish the chemical inventory of the proplyds, since numerous simple species can be

observed in the 1-5 micron range covered by NIRSpec, including CO, OH, H2O, CH+, C2H2, CH3+, etc.. The ONC is the best environment to probe the effect of massive stars on star/planet formation and JWST/NIRSpec is currently the only instrument capable of deciphering how this works.

OBSERVING DESCRIPTION

The Orion Nebular Cluster is observable between 10/Sep/2024 - 07/Nov/2024, 20/Jan/2025 - 19/Mar/2025, and 12/Sep/2025 - 30/Sep/2025. We will use the MSA on NIRSpec to obtain multi-object spectroscopy of approximately 50 proplyds, using high resolution mode (R=2700), and the full wavelength coverage of NIRSpec with grating filter/combinations G140H/F100LP, G235H/F170LP, and G395H/F290LP. The telescope will be nodded 3 times, in order to obtain nebular background spectra to facilitate nebular subtraction from the proplyd spectra. Nodding will also improve signal-to-noise by a factor of ~1.7.

The total time requested is 5.15 hours, with 0.55 hours of science time. The resulting data volume is 4705.98 MB.

Proposal 5547 - Targets - Spectral catalogue of externally ionized protoplanetary disks in the Orion Nebular Cluster

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(258)	MPT_plan_FINAL	RA: 05 35 16.9673 (83.8206971d) Dec: -05 23 24.36 (-5.39010d) Equinox: J2000		

Comments:
Description=[]

Observation

Proposal 5547, Observation 3: 1228_FINAL_6 Fri Jan 10 22:00:31 GMT 2025

Diagnostic Status: Warning

Observing Template: NIRSpec MultiObject Spectroscopy

Diagnostics

(Visit 3:1) Warning (Form): Overheads are provisional until the Visit Planner has been run.

Fixed Targets

#	Name	Target Coordinates	Targ. Coord. Corrections	Miscellaneous
(258)	MPT_plan_FINAL	RA: 05 35 16.9673 (83.8206971d) Dec: -05 23 24.36 (-5.39010d) Equinox: J2000		

Comments:
Description=[]

Acquisition

#	Reference Star Bin	Target	Filter	MSA Configuration	Readout Pattern	Groups/Int	Integrations/Exp	Total Integrations	Total Exposure Time	ETC Wkbk.Calc ID
1	Filter: F110W; Readout: NRSRAPID; 8 sources in 2 quads; [Reduced Accuracy]	SAME	F110W	Auto Acq MSA Config	NRSRAPID	3	1	4	171.788	

Template

TA Method	HFF Readout Mode	Obtain Confirmation Images	Science Aperture	Primary Candidate List	Filler Candidate List	Spectral Overlap Map	Spectral Overlap Threshold
MSATA	false	No	MSA Center	MPT_plan_FINAL (553 sources)	TA_stars_FINAL (314 sources)	jwst-nirspec-hr	1.5

Reference Stars

Visit	ID	RA	Dec	Magnitude	Visit	ID	RA	Dec	Magnitude
1	245	83.798863	-5.420211	19.874	1	256	83.799651	-5.380764	20.046
1	246	83.798059	-5.416644	19.967	1	396	83.787578	-5.423859	21.031736
1	249	83.812498	-5.387289	19.839	1	398	83.788287	-5.425489	20.32869
1	253	83.794533	-5.392453	20.51	1	420	83.797901	-5.418256	20.544049

Spectral Elements

#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
1	1 (G140H/F100LP)	5547.p41c2e1n1**	3 Shutter Slitlet	83.81256620833332 Degrees -5.413185277777757 Degrees	209.53520271452547			3	3	262.6
2	2 (G235H/F170LP)	5547.p41c2e1n1**	3 Shutter Slitlet	83.81256620833332 Degrees -5.413185277777757 Degrees	209.53520271452547			3	3	262.6
3	3 (G395H/F290LP)	5547.p41c2e1n1**	3 Shutter Slitlet	83.81256620833332 Degrees -5.413185277777757 Degrees	209.53520271452547			3	3	262.6
4	1 (G140H/F100LP)	5547.p41c1e1n1***	3 Shutter Slitlet	83.82170929166666 Degrees -5.405571944444432 Degrees	209.53433530731573			3	3	262.6
5	2 (G235H/F170LP)	5547.p41c1e1n1***	3 Shutter Slitlet	83.82170929166666 Degrees -5.405571944444432 Degrees	209.53433530731573			3	3	262.6
6	3 (G395H/F290LP)	5547.p41c1e1n1***	3 Shutter Slitlet	83.82170929166666 Degrees -5.405571944444432 Degrees	209.53433530731573			3	3	262.6
7	1 (G140H/F100LP)	5547.p49c2e1n1**	3 Shutter Slitlet	83.8215775 Degrees -5.4022116666666875 Degrees	209.534341259126			3	3	262.6
8	2 (G235H/F170LP)	5547.p49c2e1n1**	3 Shutter Slitlet	83.8215775 Degrees -5.4022116666666875 Degrees	209.534341259126			3	3	262.6
9	3 (G395H/F290LP)	5547.p49c2e1n1**	3 Shutter Slitlet	83.8215775 Degrees -5.4022116666666875 Degrees	209.534341259126			3	3	262.6
10	1 (G140H/F100LP)	5547.p49c3e1n1**	3 Shutter Slitlet	83.82453120833334 Degrees -5.4054738888888878 Degrees	209.53407190253836			3	3	262.6
11	2 (G235H/F170LP)	5547.p49c3e1n1**	3 Shutter Slitlet	83.82453120833334 Degrees -5.4054738888888878 Degrees	209.53407190253836			3	3	262.6
12	3 (G395H/F290LP)	5547.p49c3e1n1**	3 Shutter Slitlet	83.82453120833334 Degrees -5.4054738888888878 Degrees	209.53407190253836			3	3	262.6
13	1 (G140H/F100LP)	5547.p49c4e1n1**	3 Shutter Slitlet	83.82283270833332 Degrees -5.414093611111127 Degrees	209.53424630489994			3	3	262.6
14	2 (G235H/F170LP)	5547.p49c4e1n1**	3 Shutter Slitlet	83.82283270833332 Degrees -5.414093611111127 Degrees	209.53424630489994			3	3	262.6

	#	Exposure Specification	MSA Configuration	Nod Pattern	Pointing	Aperture PA	Dispersion Offset (Shutters)	Cross-Dispersion Offset (Shutters)	Total Dithers	Total Integrations	Total Exposure Time
	15	3 (G395H/F290LP)	5547.p49c4e1n1**	3 Shutter Slitlet	83.82283270833332 Degrees -5.414093611111127 Degrees	209.5342463048994			3	3	262.6
Special Requirements	MSA Scheduled Aperture PA 209.5344 to 209.5344 Degrees (V3 70.95987 to 70.95987)										