

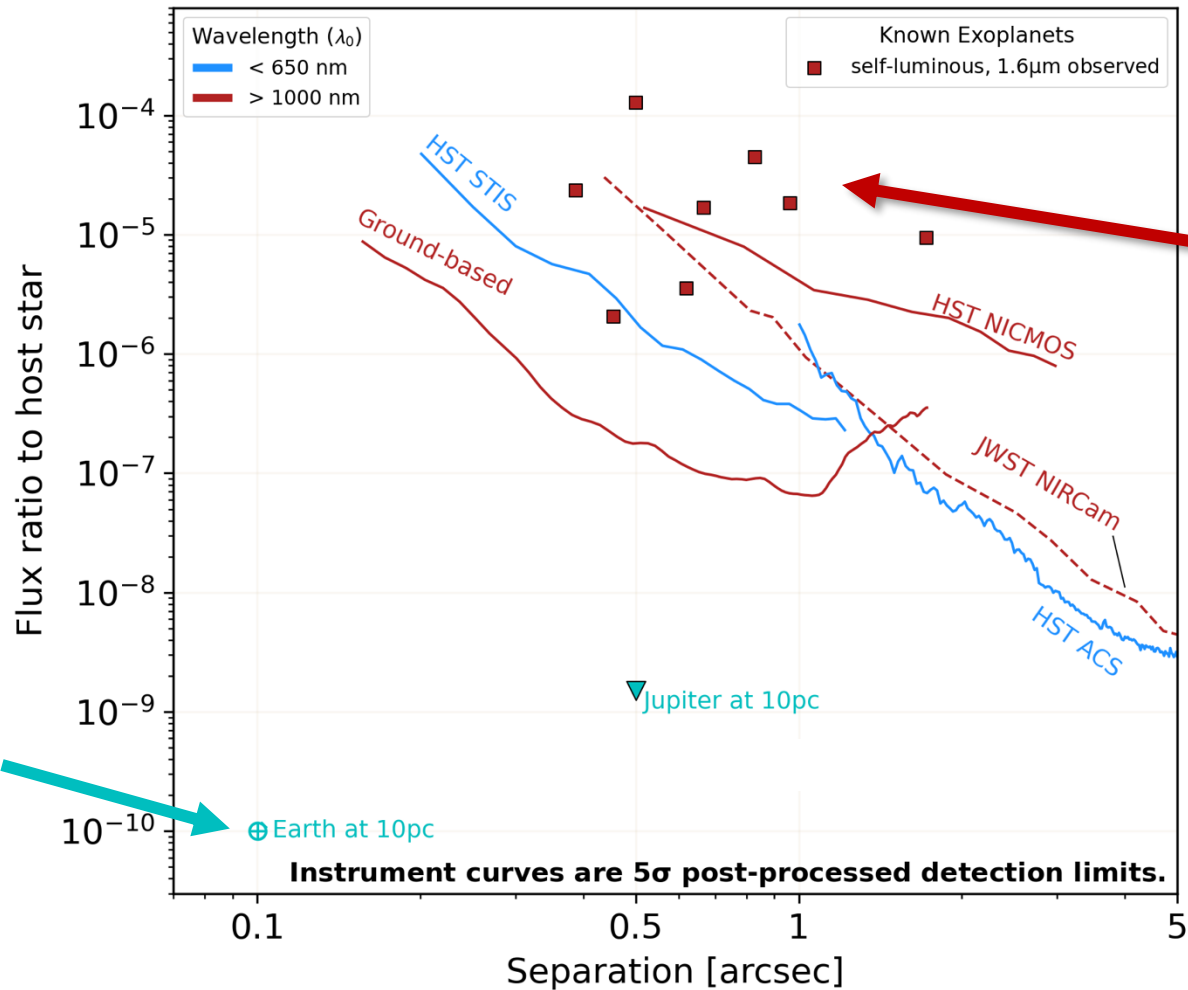
Roman Coronagraph Instrument Time Prioritization



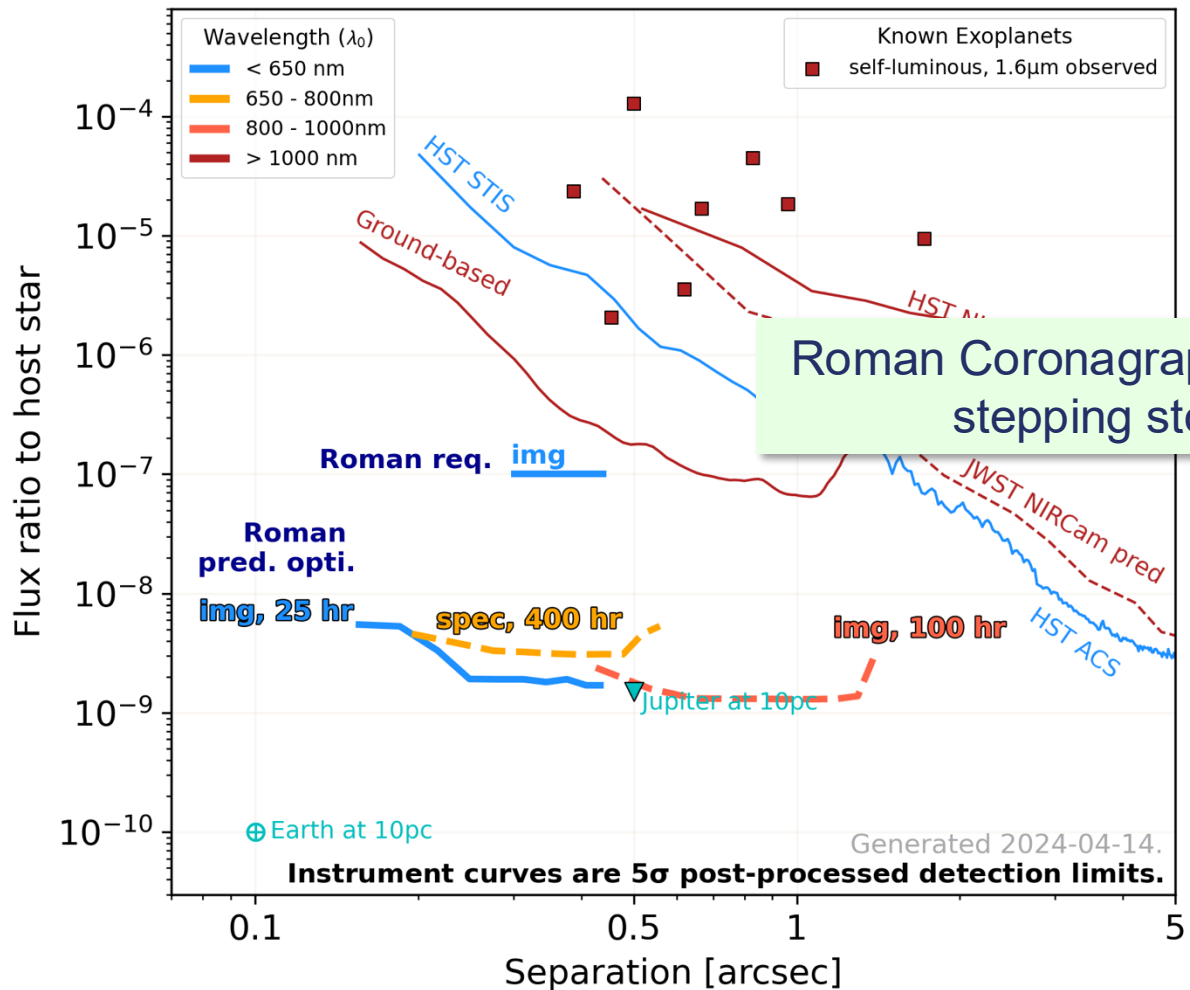
Justin Hom (University of Arizona)
on Behalf of the Roman Coronagraph Community Participation Program (CPP)
ExoPAG 33
January 4th, 2026



Habitable
Worlds
Observatory
(HWO)
mission
concept



IR self-luminous
young
“super
Jupiters”

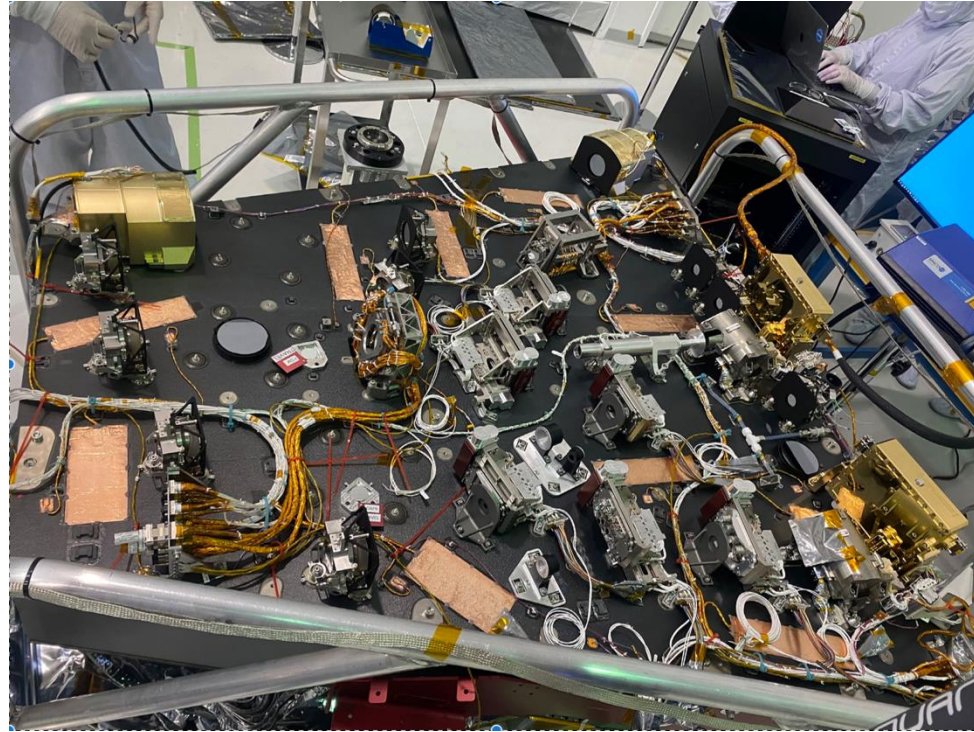


Roman Coronagraph will be a stepping stone

Roman Coronagraph paves the way for Habitable Worlds Observatory



- the first space-based coronagraph with active wavefront control
- a **visible light** “technology demonstration” instrument
 - “easy” requirement: 10^{-7} detection limit
 - Ambitious goals: few 10^{-9}
- a risk mitigation for HWO
- Launch to L2 no later than May 2027, Current estimate: Oct 2026



1 fully supported mode

Additional “best effort” modes: spectroscopy & polarimetry



Band	λ_{center}	BW	Mode	FOV radius	FOV Coverage	Pol?	Coronagraph Mask Type	Support
1	575 nm	10%	Narrow FOV Imaging	0.15" – 0.45"	360°	Y **	Hybrid Lyot	Req'd
1	575 nm	10%	“Wide” FOV Imaging	0.3" – 1.01"	360°	Y	Shaped Pupil	Best Effort
2	660 nm	17%	Slit + R~50 Prism Spectroscopy	0.17" – 0.52"	2 x 65°	-	Shaped Pupil	Best Effort
3	730 nm	17%	Slit + R~50 Prism Spectroscopy	0.18" – 0.55"	2 x 65°	-	Shaped Pupil	Best Effort
4	825 nm	11%	“Wide” FOV Imaging	0.45" – 1.4"	360°	Y	Shaped Pupil	Best Effort

“Best effort” modes will not be end-to-end performance tested prior to delivery & do not have guaranteed support on-orbit.

** Polarimetry in Band 1 is ‘best effort’

See [Riggs et al. 2025](#) for all possible observing modes 5

Observation Plan for the Coronagraph “Observation Phase”

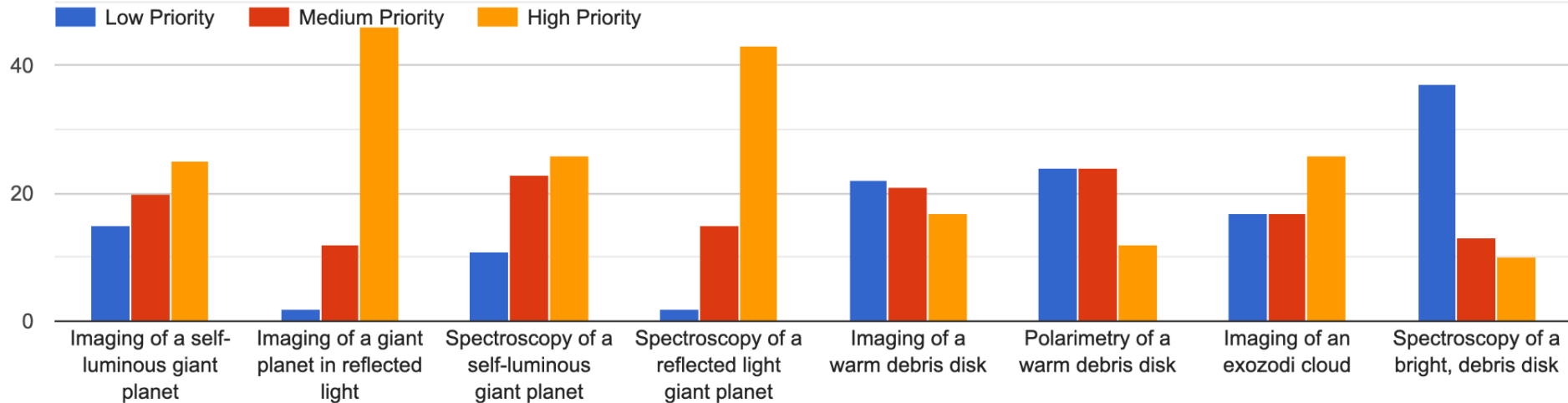


- Baseline: 2200hr (90 days) during first 18mo of Mission
- Top priority: achieve L1 Technology Requirement
 - Flux ratio of at least 10^{-7} on a $V \sim 5$ star in Band 1
- Then, as time/resources allow, push performance limits and commission additional observing modes
- Prioritize scientifically-interesting targets when possible
 - Not available for GO programs
 - Roman data has no proprietary period

2024 Community Interest Survey



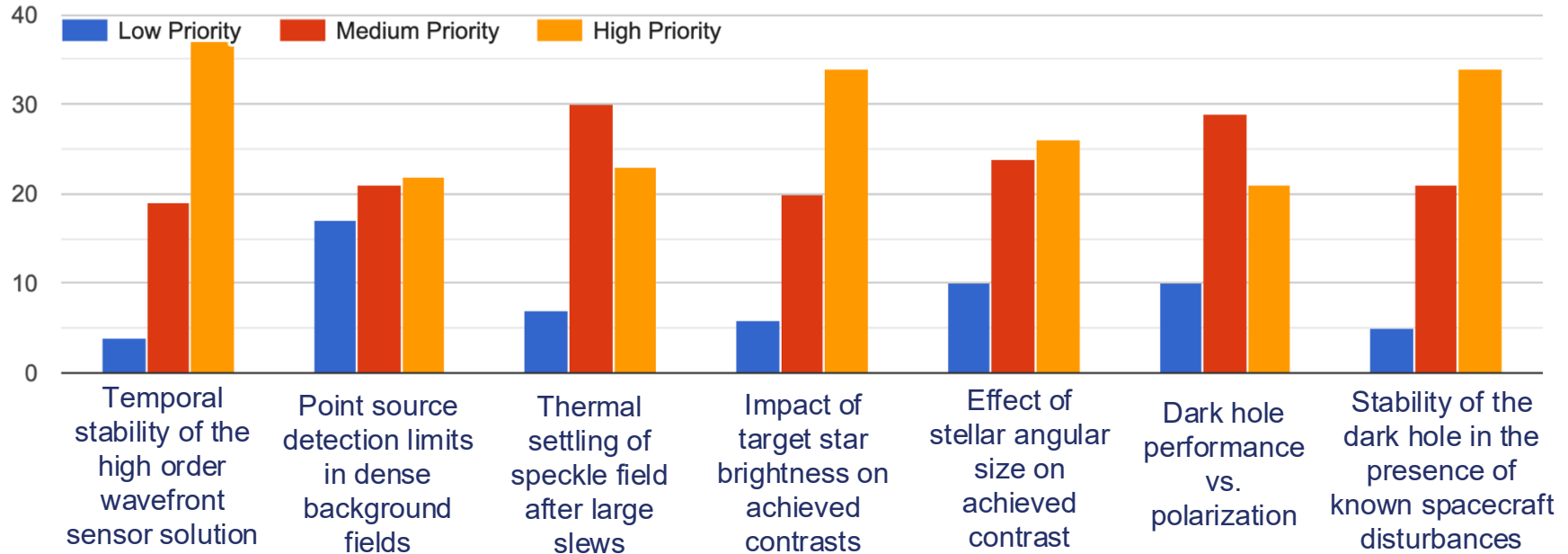
The Roman Coronagraph enables new exoplanetary and debris disk science at $\sim 550\text{-}850\text{ nm}$. Please indicate your level of interest in the science cases listed below.



2024 Community Interest Survey



The Roman Coronagraph has the potential to be an invaluable technology pathfinder for the upcoming Habitable Worlds Observatory. Please indicate your level of interest in the technology demonstration activities below.



Ensuring a Valuable Legacy Dataset: Summer 2025 White Paper Call



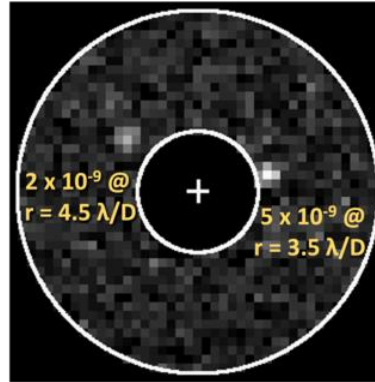
- What technology demonstration observations, science observations, and observing modes does the community most want to see happen during commissioning, in the baseline observation phase, and beyond?
- ~80 community white papers were submitted!



Summary of White Paper Topics

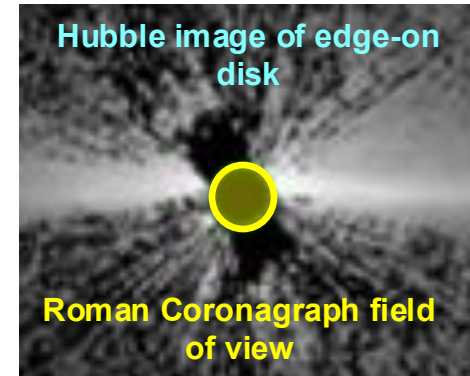
Keywords provided in WP LaTeX template:

- Disks
- Companion (exoplanet)
- Companion (substellar)
- Self-luminous
- Reflected light
- Other science
- Observing strategy
- Post-processing
- Control algorithm
- High contrast performance



Simulated observation of 47 UMa, using Observing Scenario 11 (J. Krist, 2022)

Schneider et al. (2014)





CPP Time Prioritization Committee (TPC)

- The Time Prioritization Committee was formed to review all white paper submissions and make recommendations for observing program maturation
- Consists of US CPP PIs, representatives from ESA, MPIA, and JAXA, members of the Instrument Team and the Science Support Center
- TPC met in October to review all white paper submissions
- Five topical sub-panels (science and tech) synthesized white paper submissions and constructed example observing campaigns to be planned for the first six months of operations (~700-800 hours of CGI-primary wall clock time), with an oversubscription rate of ~2x



Outcomes of October TPC Review

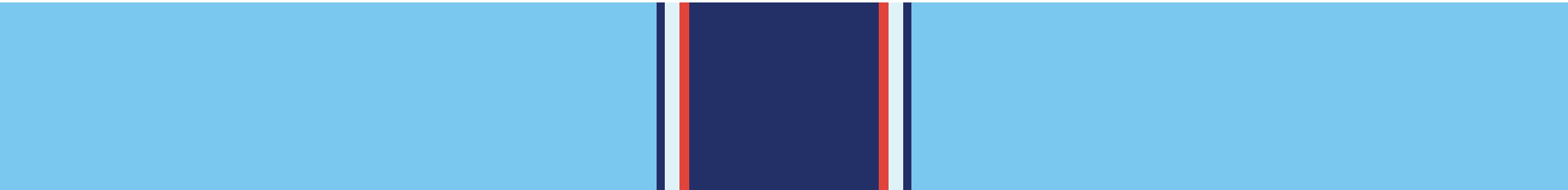
- List of programs to be matured into proposals for the first ~6 months of operations
- A list of highly-rated observing program ideas inspired by WPs that are candidates for later implementation (later in baseline or in extended mission)
- Once these program ideas are matured, the TPC will meet again in January to down-select prioritization for the 1st 6 months of the Observation Phase
- Program ideas that are not down-selected may be deferred to later stages of the Observation Phase and a possible extended mission
- More details about specific observing program themes/targets and results of the program prioritization down-select will be presented at Spirit of Lyot 6 (February 2-6) in Pasadena.



Summary

- The Roman Coronagraph is a critical technology and science pathfinder for HWO
- There is strong community interest in maximizing the technical and science return of CGI
- The CPP TPC is meeting in January to prioritize observing programs for commissioning and the first 6 months of observations
- These selections and further details for the Observation Phase will be presented at Spirit of Lyot 6 (February 2-6)

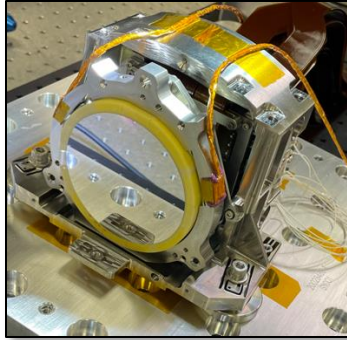
Backup Slides



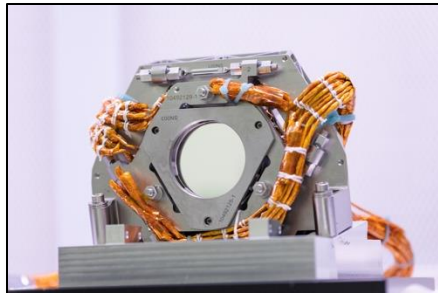
Roman Coronagraph demonstrates multiple technologies at HWO-relevant performance



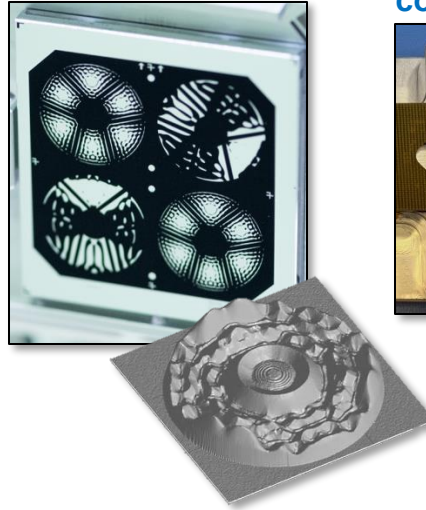
Large-format
Deformable Mirrors
(48x48)



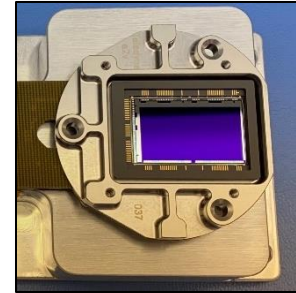
Ultra-Precise
(~10pm RMSE goal)
Wavefront Sensing
& Control
(Ground-In-The-Loop)



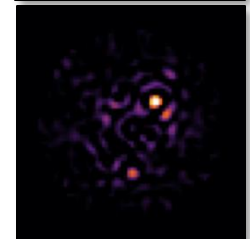
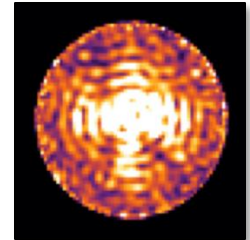
High-contrast
Coronagraph Masks for
obscured apertures



Ultra-low-noise
EMCCDs
Goal: photon-
counting flux levels



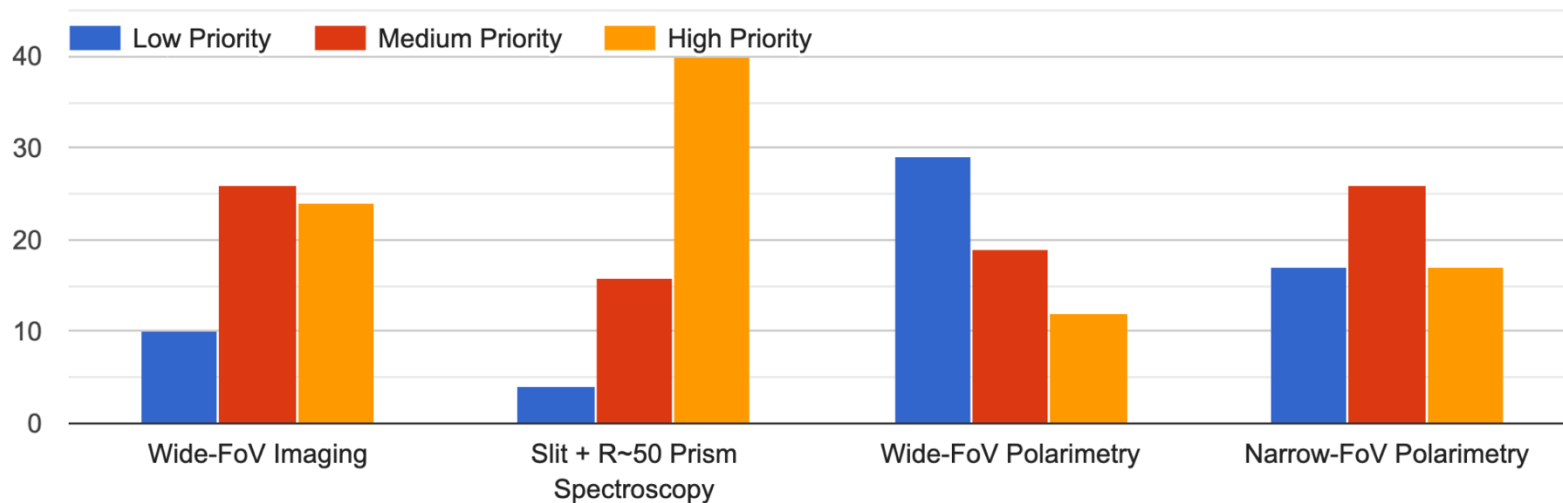
Data Post-
Processing
Goal: Photon-
counting



2024 Community Interest Survey



Imaging with the Hybrid Lyot Coronagraph (Band 1, 14 - 45 mas; see Primer) is the only officially supported mode. Please rank your level of interest in seeing these "best-effort" modes exercised.





White Papers → Sub-Panel Divisions

