

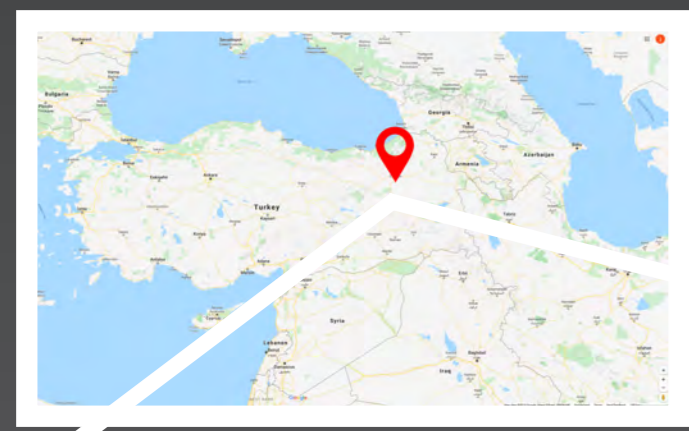
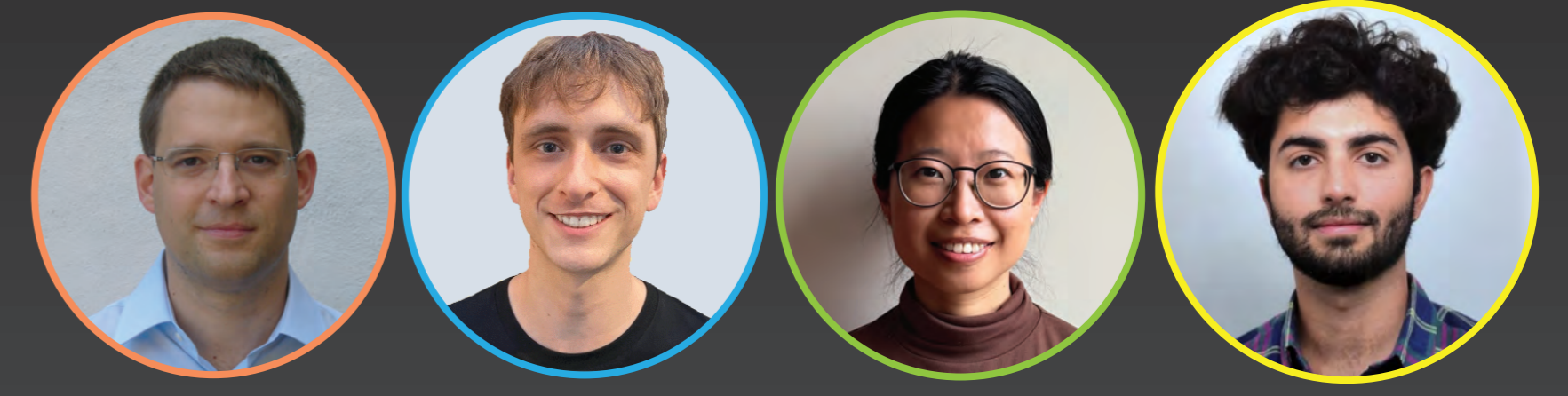


# The Active DAG/PLACID Coronagraph: Discovery Space and Binary Star Observing Mode

Ruben Tandon<sup>1</sup>, Lucas Marquis<sup>1</sup>, Liurong Lin<sup>1</sup>, Derya Öztürk Çetni<sup>2</sup>, and Jonas G. Kühn<sup>1</sup>

Email: [ruben.tandon@unibe.ch](mailto:ruben.tandon@unibe.ch), [liurong.lin@unibe.ch](mailto:liurong.lin@unibe.ch), [lucas.marquis@unibe.ch](mailto:lucas.marquis@unibe.ch), [jonas.kuehn@unibe.ch](mailto:jonas.kuehn@unibe.ch)

<sup>1</sup> Division of Space and Planetary Sciences, Physics Institute, University of Bern, Sidlerstrasse 5, 3012 Bern, Switzerland;  
<sup>2</sup> Türkiye National Observatories, Atatürk University District, Prof. Dr. Lütüf Ülkümen Street 8/3, 25050 Yakutiye/Erzurum, Turkey



Doğu Anadolu Gözlemevi (DAG, Eastern Anatolia Observatory)

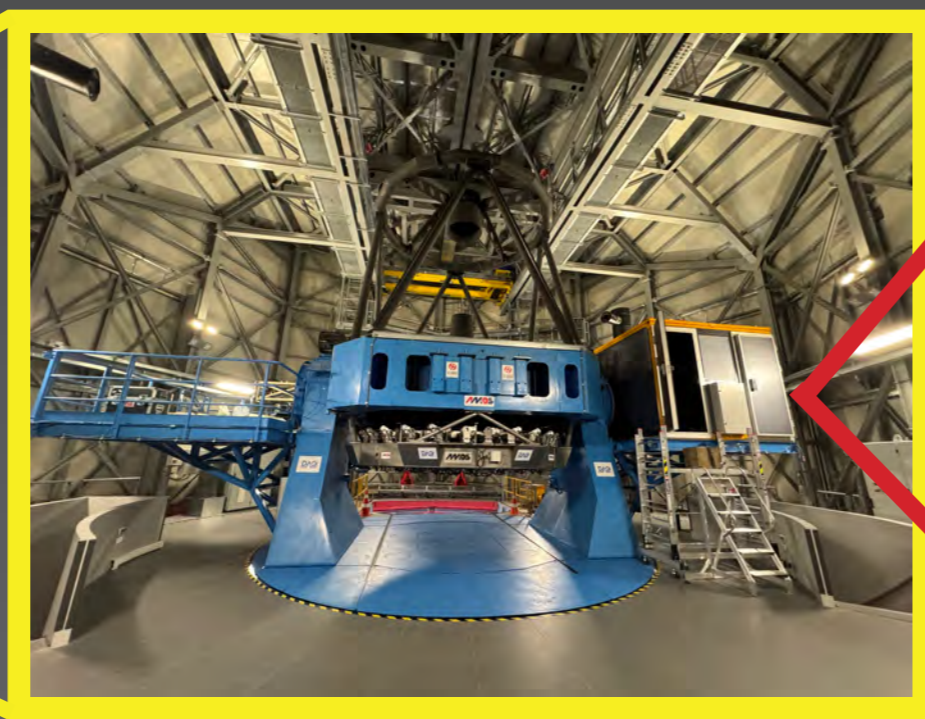
TROIA: XAO-system developed by HEIG-VD Yverdon, Switzerland

TuRkish adaptive Optics system for Infrared Astronomy (TROIA):

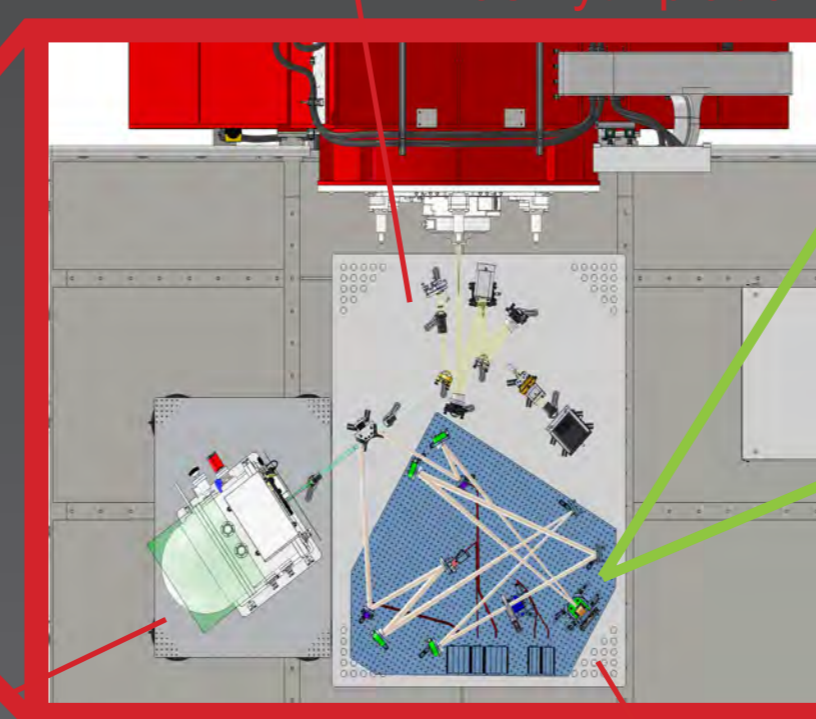
- Extreme adaptive optics system (XAO) with a pyramid wavefront sensor (P-WFS)
- ALPAO deformable mirror (DM) with 468 actuators
- low-noise WFS-camera, EMCCD from Nüvü



DIRAC NIR camera: developed by Macquarie University Sydney, Australia

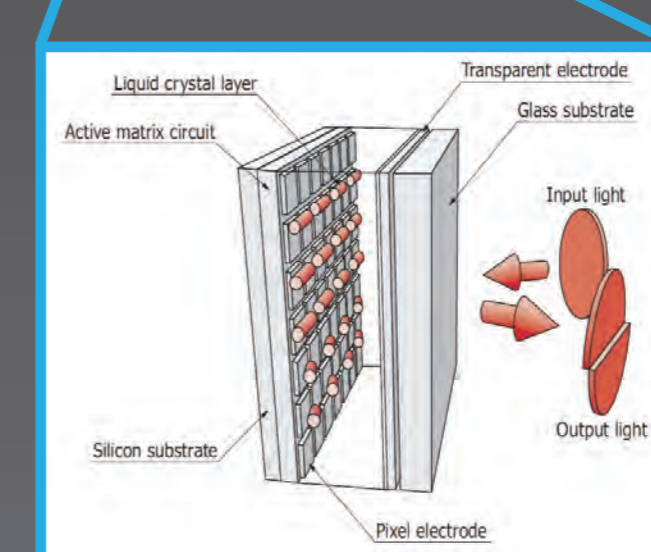
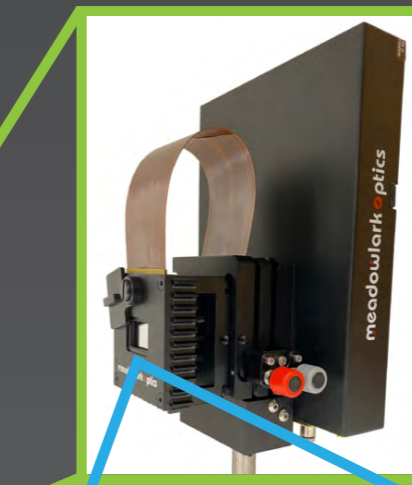


DAG 4m-telescope



Nasmyth platform

Spatial Light Modulator (SLM)



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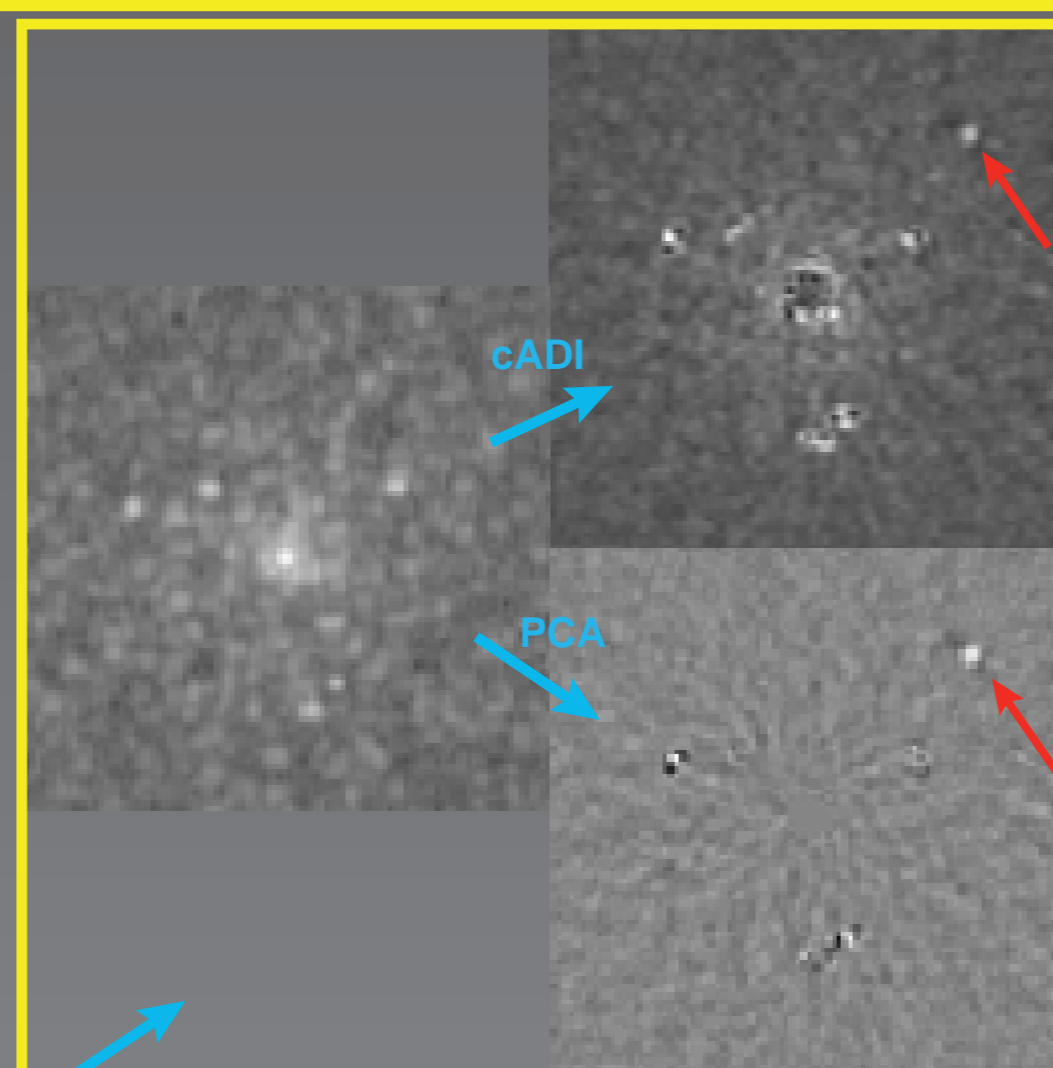


The Programmable Liquid-crystal Active Coronagraphic Imager for the DAG telescope (PLACID) instrument is the **world's first** Spatial Light Modulator-based (SLM) active coronagraphic imager

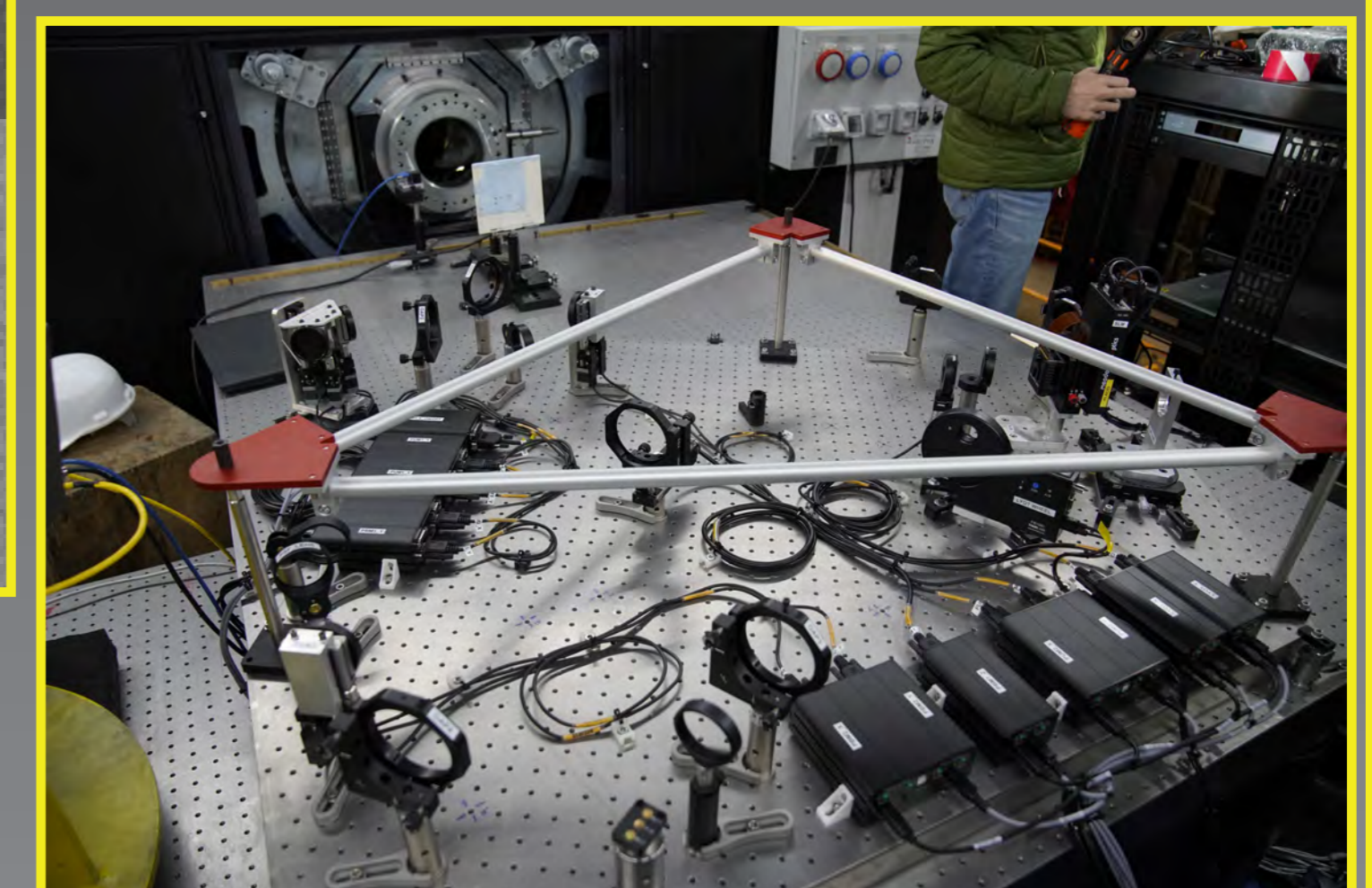
- Any coronagraphic focal plane phase mask (FPM, scalar) can be programmed onto the SLM using micron sized pixels

Preparing for PLACID on-sky commissioning and early science:

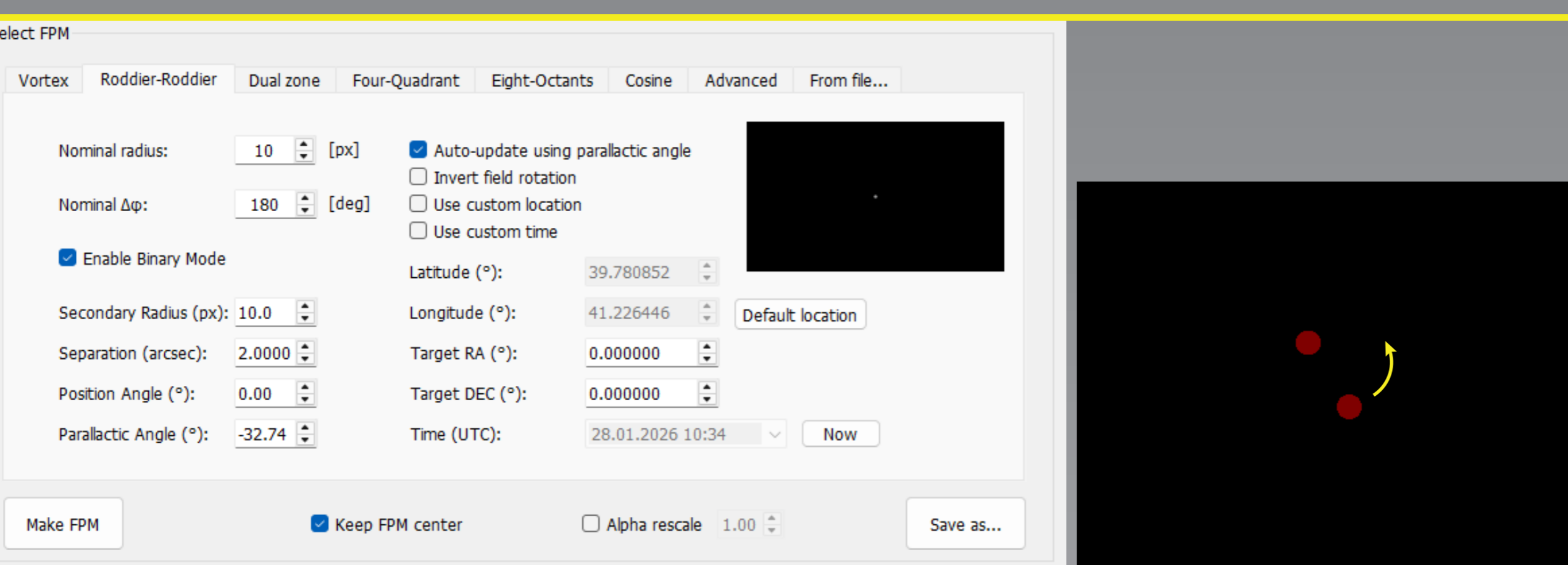
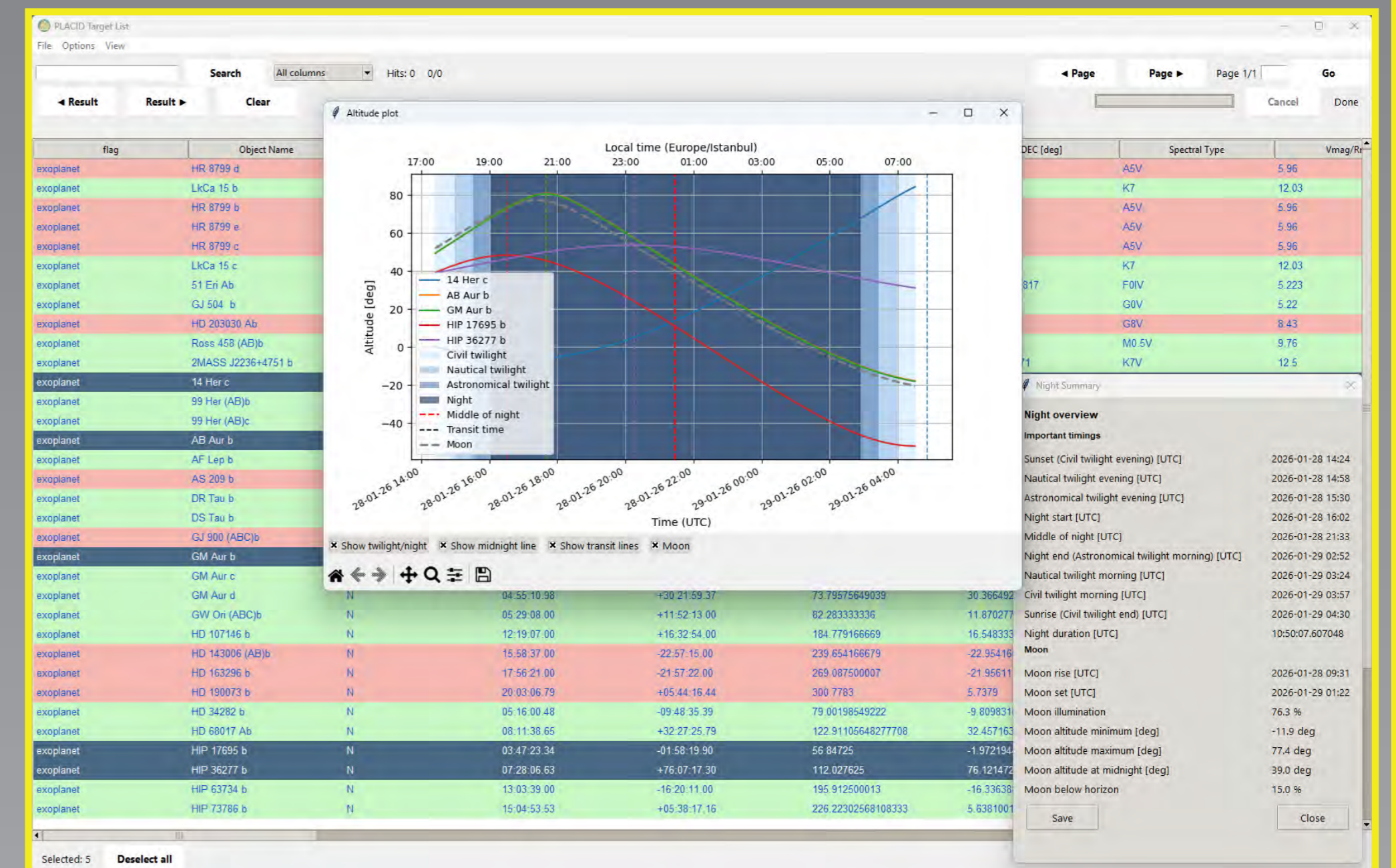
- Exposure time calculator (ETC)
- Data reduction software (DRS), based on PynPoint (Stolker et al. 2019) and compatible with Angular Differential Imaging (ADI, i.e. classical ADI (cADI) and principal component analysis (PCA)), currently working with simulated data
- Binary star ADI observing mode and related DRS
  - 2 Roddier&Roddier masks, one centered on primary star, the other following secondary (field rotation)



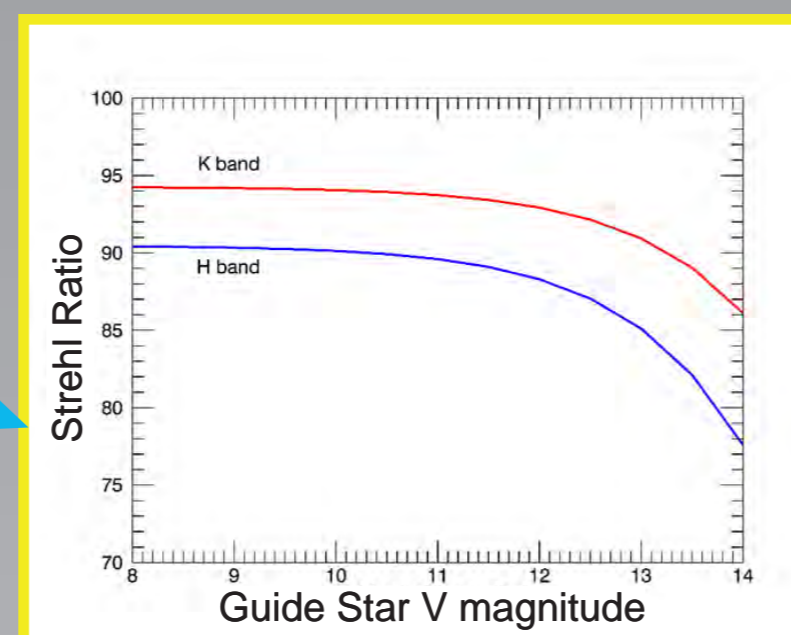
PLACID after cabling at DAG, Turkey, June 2025



PLACID Observation tool



- Target list and on-sky discovery space
  - Known exoplanets / candidates, brown dwarfs
  - Circumstellar disks
  - Binaries / triples
  - Constraints:
    - Site: DEC  $\geq -24^\circ$
    - AO NGS limiting magnitude  $V \leq 13$  mag
    - On-sky FOV:  $16'' \times 9.6''$

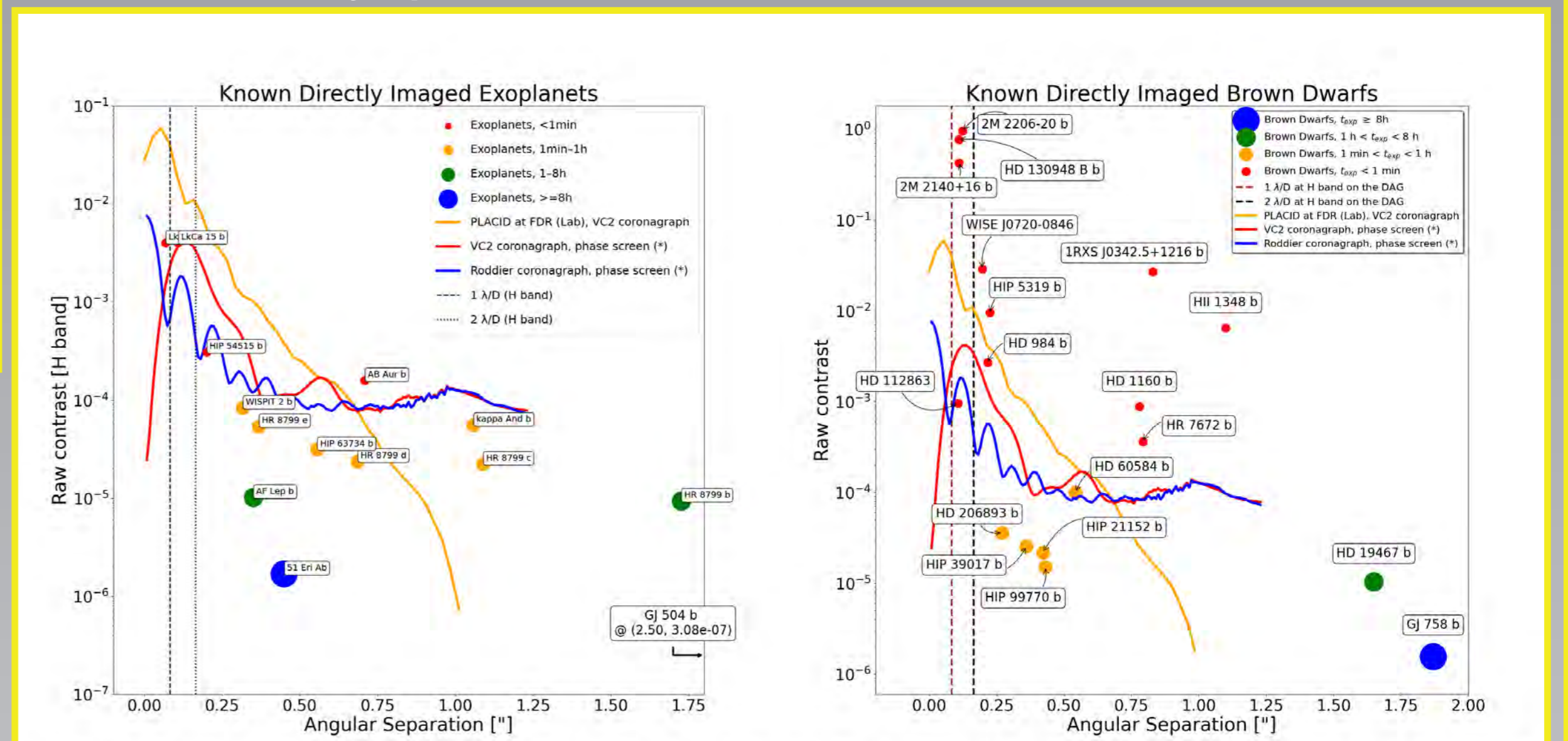


Credit: HEIG-VD

- Observation tool (GUI) for target list (see figure)

- Limited spatial resolution of SLM: for detailed simulation and analysis of a pixelated FPM, see [Liurong Lin's poster](#) at Session 2, No. 57
- For the PLACID timeline and general info, see [Jonas Kühn's poster](#) at Session 2, No. 44

PLACID Discovery Space



(\*) PLACID simulations with post-AO wavefront error residuals, assuming seeing=1", Vmag=8, ZA=30 (credit: HEIG-VD) (\*) PLACID simulations with post-AO wavefront error residuals, assuming seeing=1", Vmag=8, ZA=30 (credit: HEIG-VD)