EPICS, exoplanet imaging with the E-ELT

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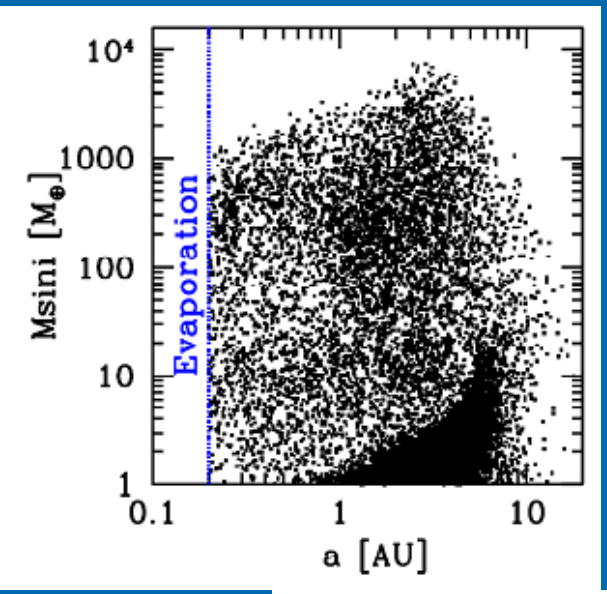
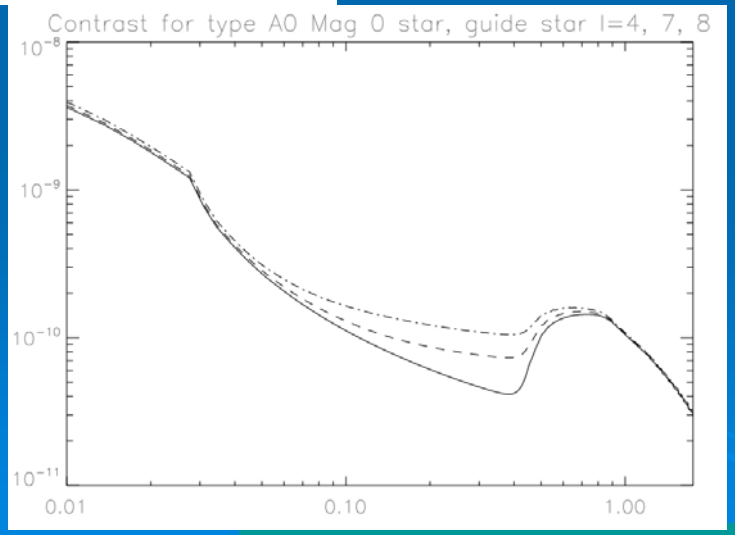
Predicted Science Output



MC simulations

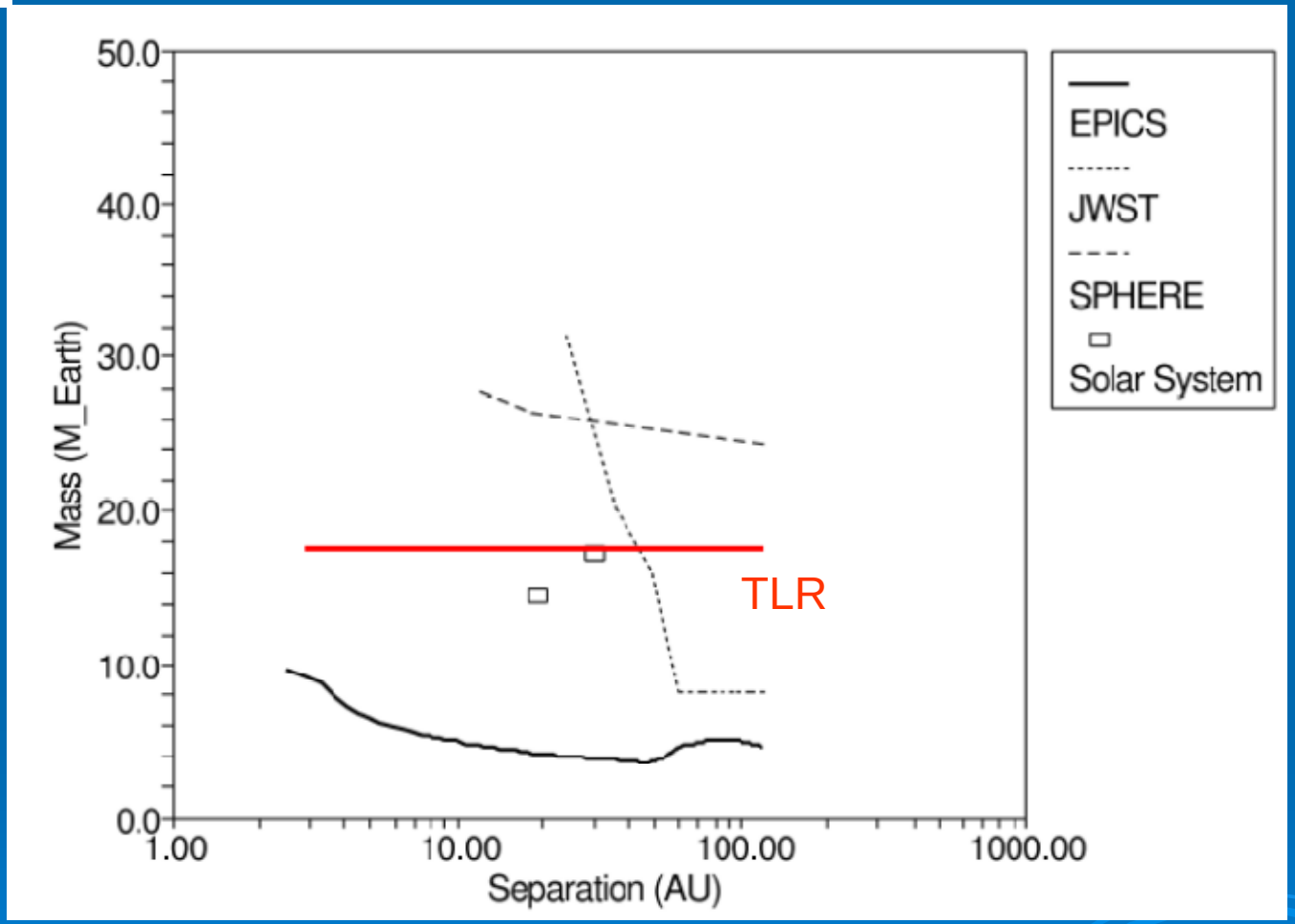
- planet population with orbit and mass distribution from e.g. Mordasini (2007)
- Model planet brightness (self-luminous, in reflection, albedo, orbital position,…)
- Match statistics with RV results



Contrast model

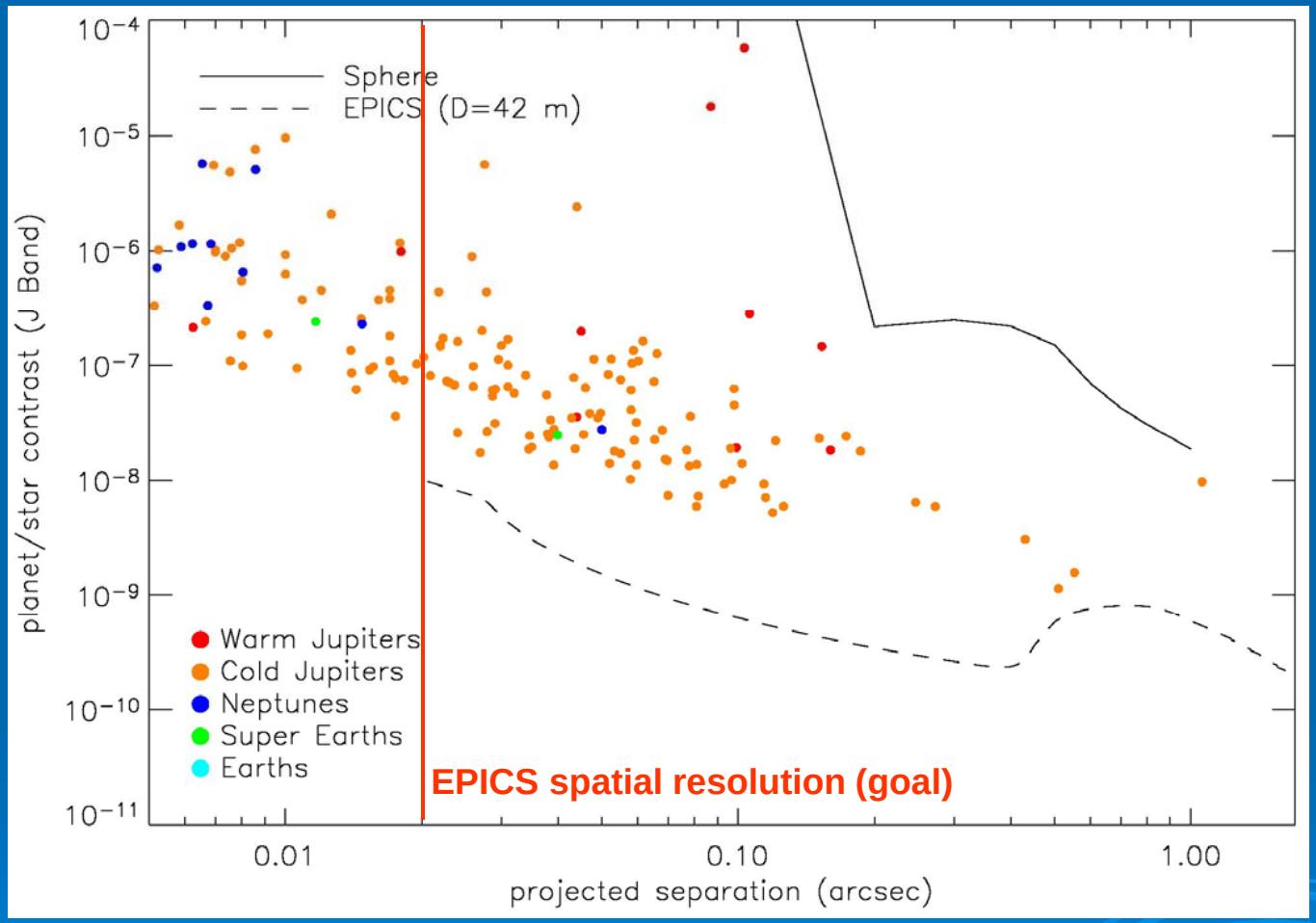
- Analytical AO model incl. realistic error budget
- Actual wavelength range and throughput estimate, 4h obs
- Data analysis considered
- Idealized Coro + statics corr.

Young Planets



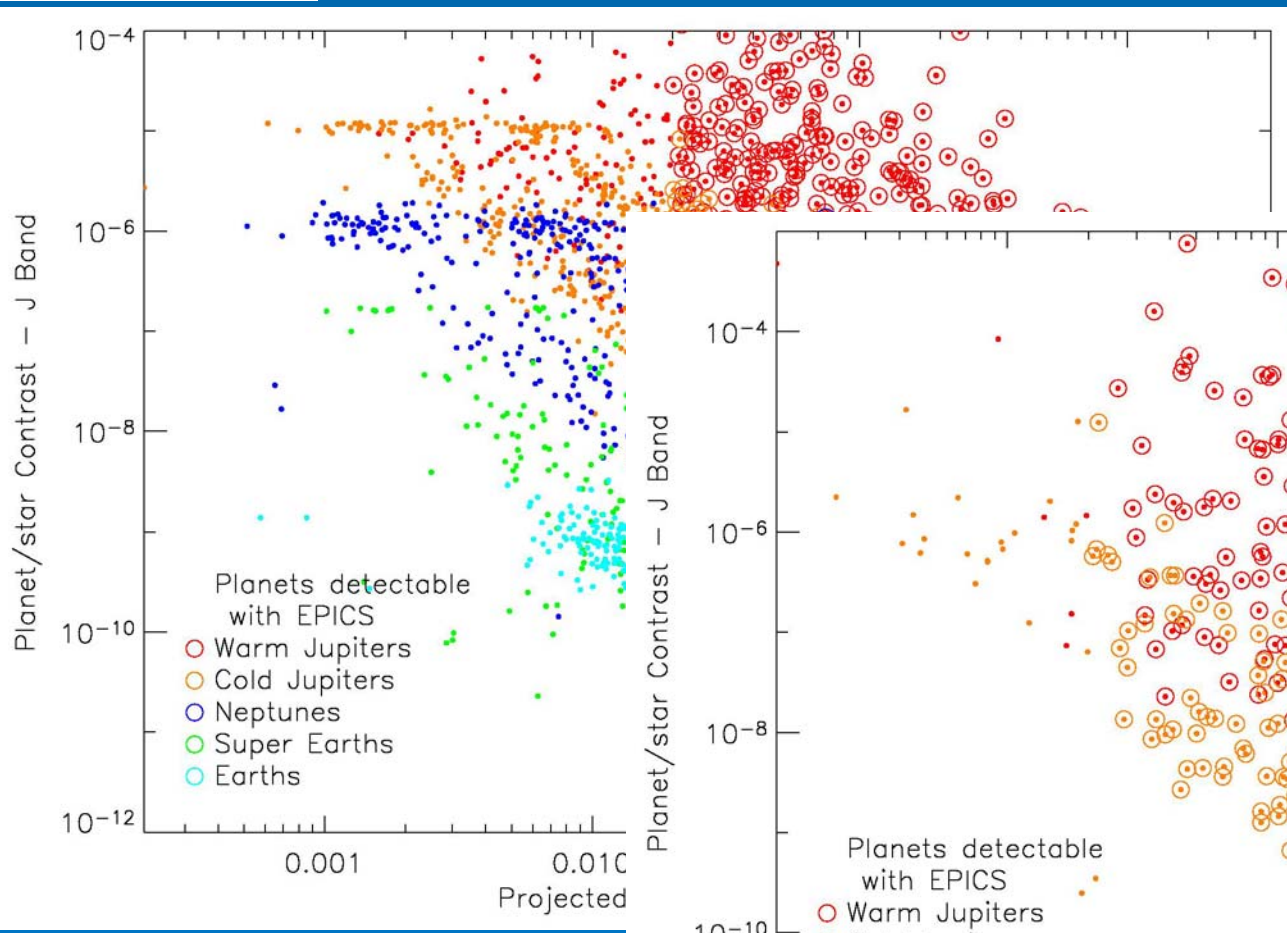
Limiting detectable mass of planets as a function of physical separation around a 10 Myr old G2V star at a distance 120 pc

Known planets



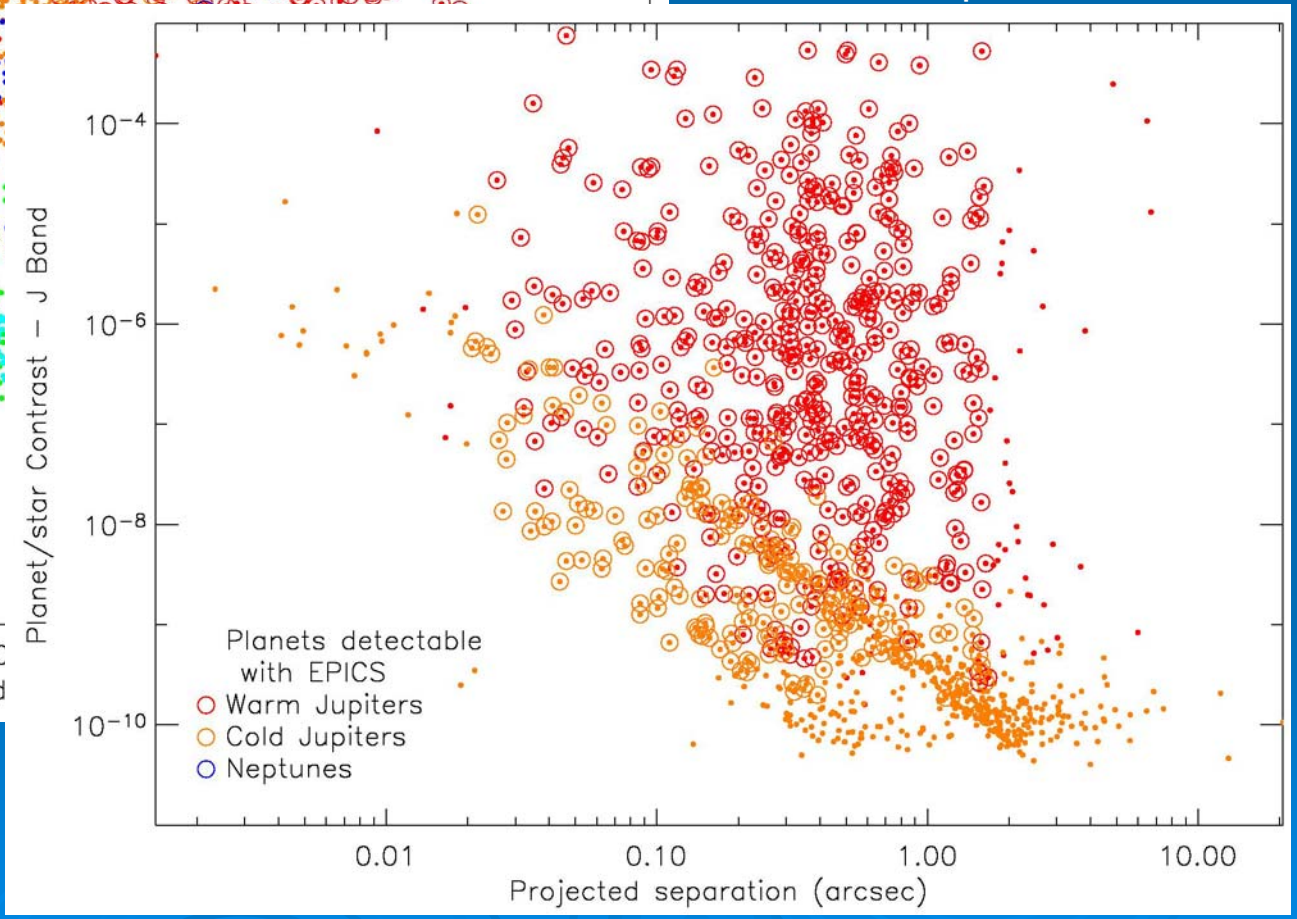
About 100 currently known targets are readily observable with EPICS, and many more are expected to be discovered by e.g. GAIA or SPHERE

Detection rates, nearby+young stars



Mordasini et al. 2007

RV distribubtion,
extrapolated to 40 AU



Predicted detections with EPICS

Target class	# targets	Self-luminous planets	Giant planets	Neptunes	Rocky planets
1. Young stars	688	>100	>100	Dozens	Very few
2. Nearby stars	512	Dozens	>100	~100	A Dozen
3. Stars w. planets	~100	Some	>100	A Dozen	2+

Summary

- EPICS is the NIR E-ELT instrument for Exoplanet research using a “standard” high contrast imaging approach.
- Phase-A to study concept, demonstrate feasibility by prototyping, provide feedback to E-ELT and come up with a development plan
- Conclusion of Phase-A in 2010 with E-ELT phase B
- Potential to exploit the E-ELT capabilities in order to greatly advance and provide unique contribution to Exoplanet research