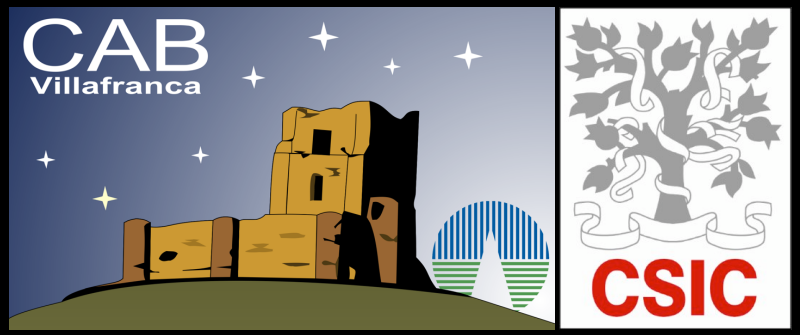
On a full confirmation and characterization of Kepler planet candidates

Jorge Lillo-Box
and
D. Barrado and H. Bouy



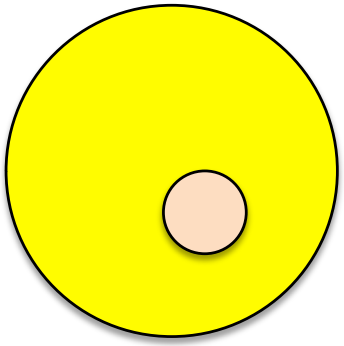
Phases of our follow-up

PHASE	Objetive	Instrument	Technique
I	- To detect isolated host - To detect multiple systems (2 or more stars)	AstraLux (Lucky Imaging)	High-spatial Resolution imaging
II	- Characterization host. - Characterization stellar companion: physical asociation?	CAFOS	Low-resolution spectroscopy
III	- Characterization star-planet and planet properties	CAFE	Stable, high-spectral resolution spectroscopy

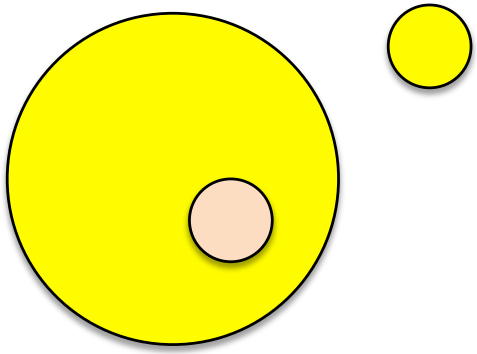
IMAGING: False positives

False positives

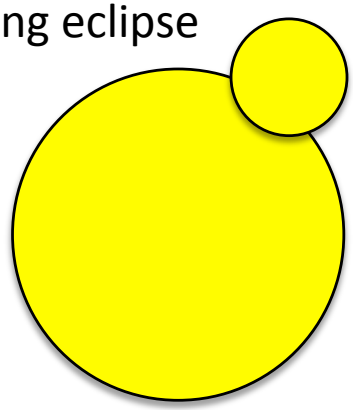
a) Low-mass EB



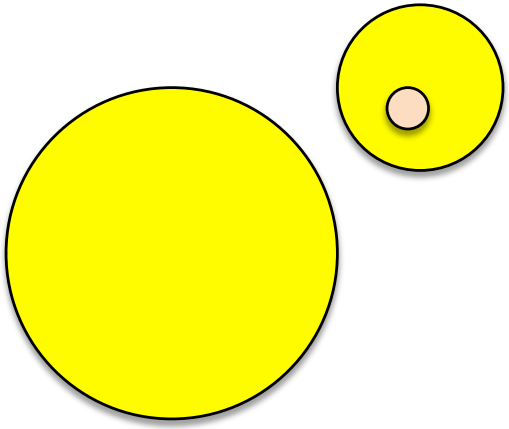
b) Low-mass EB + backgr. object



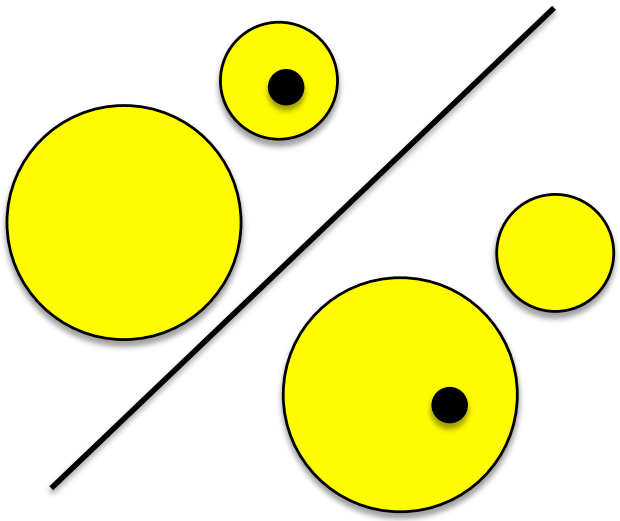
c) Grazing eclipse



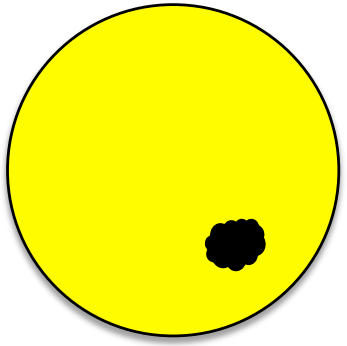
d) Background EB



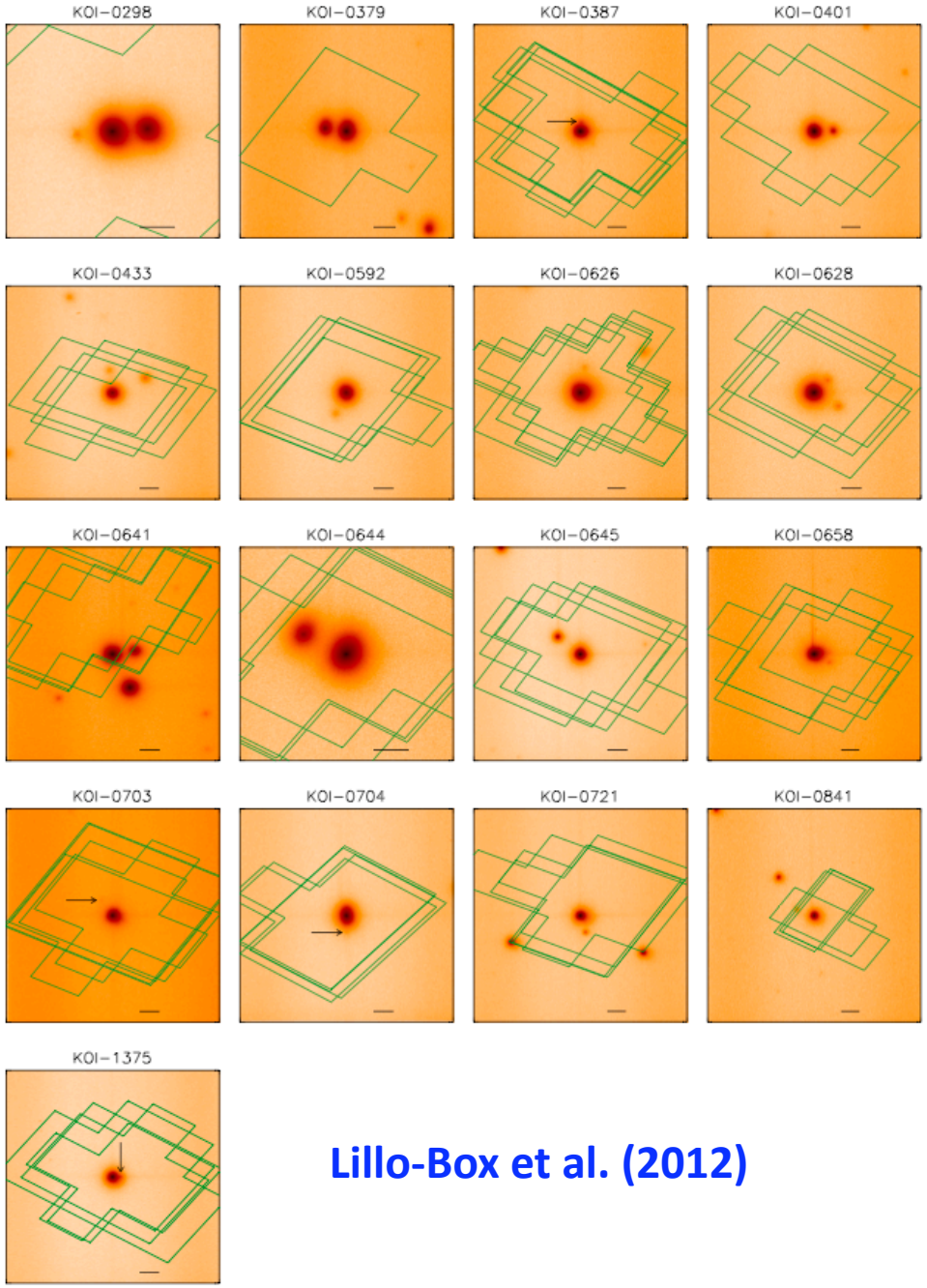
e) Background (larger) planet



f) Stellar spot



PHASE I: False positive detection (AstraLux)



Lillo-Box et al. (2012)

Conclusions

- 58% of the candidates isolated

- 17% w/ close companions

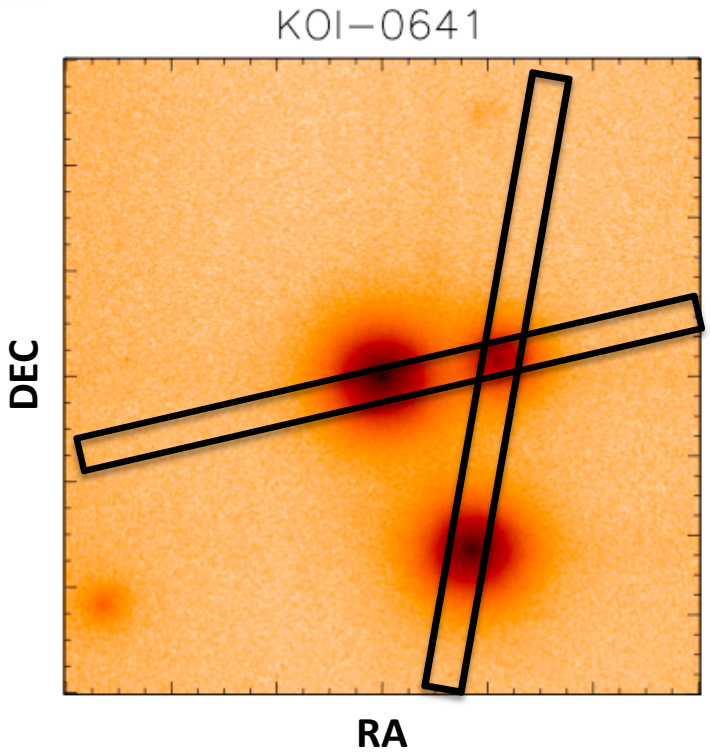
Implications

- New planet parameters needed for systems w/ close companions.

- 8 new possible bounded binary systems with planets.

- Improvement of the planet candidacy for 57-84 KOIs.

PHASE II: Host stellar properties (CAFOS)



Observations

- Low-resolution spectroscopy for 29 KOIs and their large-separation companions (if any).

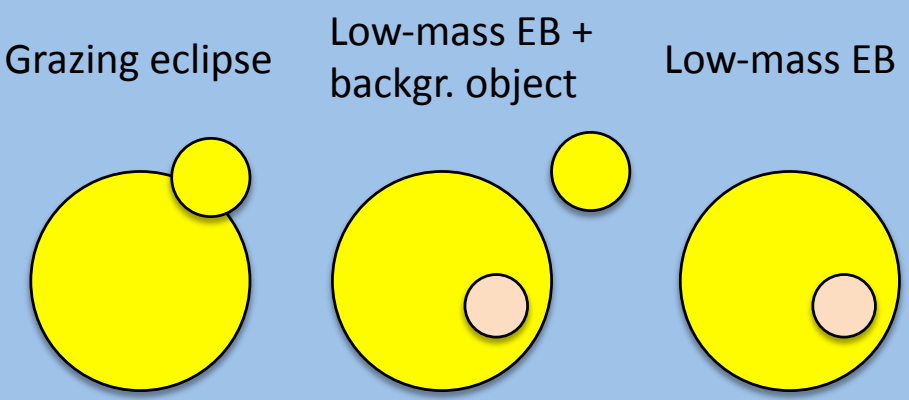
- Quasi-simultaneous R,I bands photometry for more than 40 KOIs with 3-6 arcsec companions to characterize their spectral types.

Goals

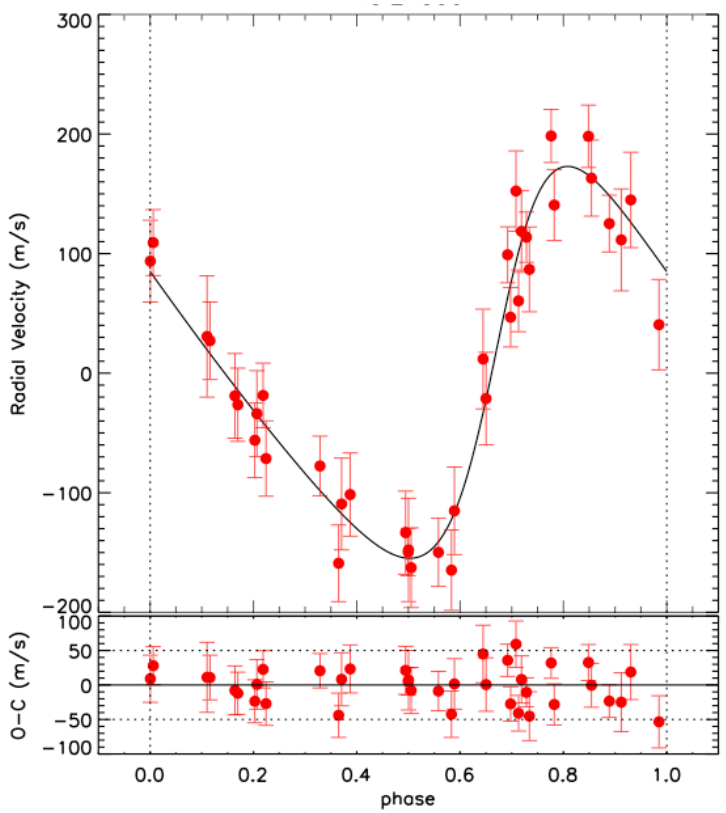
- Stellar characterization of the idolated parent stars and the large-separation companions.

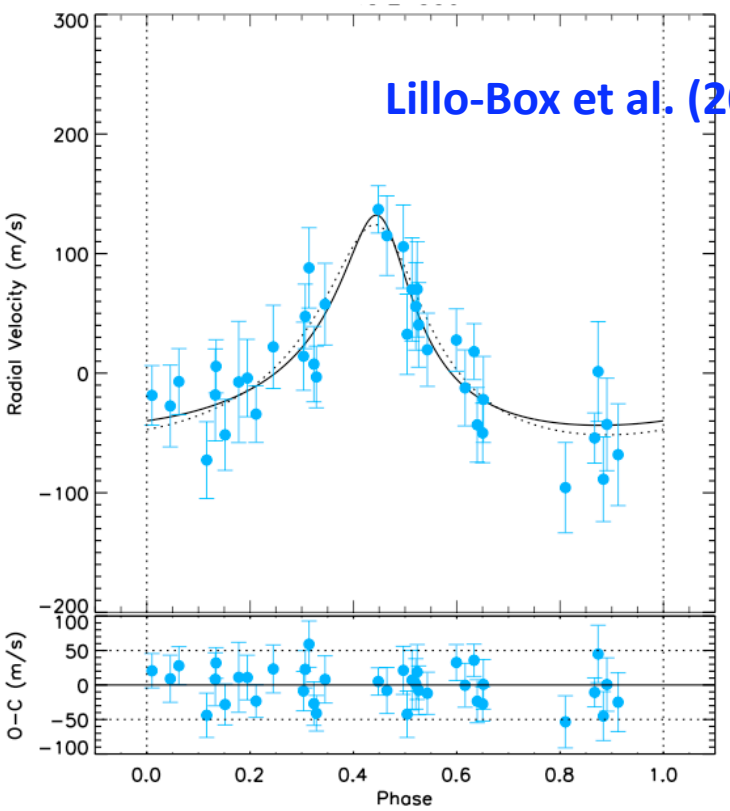
- Reject other possible configurations that could mimic the planetary transit shape.

Configurations to be ruled out by Phase II



PHASE III: Planet characterization (CAFE)





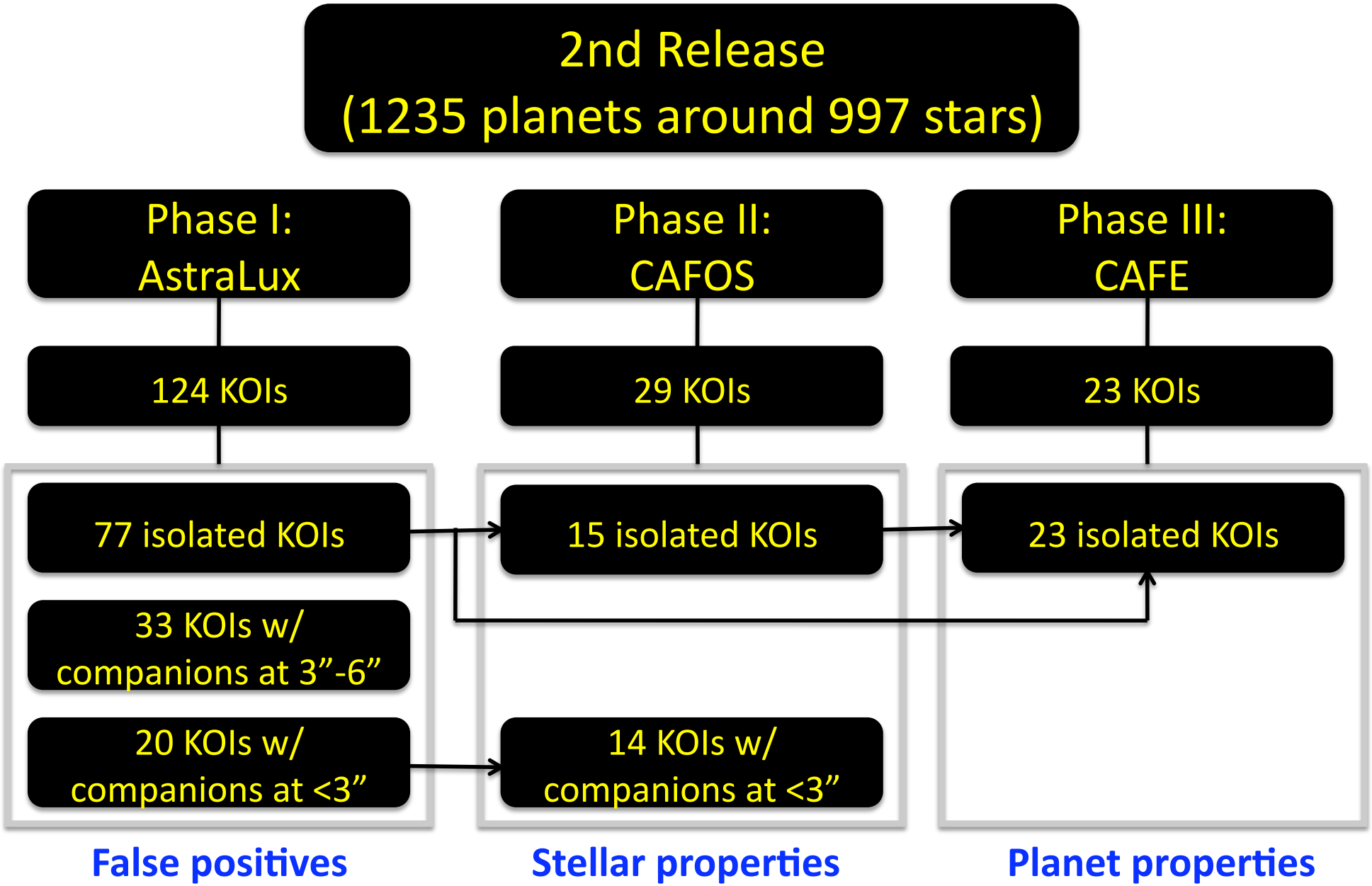
Lillo-Box et al. (2013), in prep.

Sample

- 23 planets being follwed with CAFE.
- Periods ranging from 5 to 600 days.
- Mostly giant host stars.
- Neptune- and Jupiter-size candidates.

Early results

- Confirmation and characterization of one planet candidate.
- Possible detection of a dense secondary inner planet
- Ongoing work for the confirmation of another 2-planetary system.



A three phases study: from high spatial resolution imaging, to reject **false positives** and study **multiplicity of the host star**, to high-spectral resolution for RV (and **planet properties**)