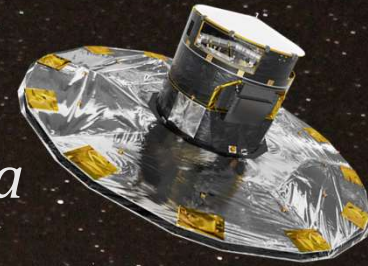


Gaia



RECONS and Gaia Astrometric Discoveries with Considerations for JWST (and TESS)

Eliot Halley Vrijmoet

RECONS/Georgia State University

ExoPAG 2019



CTIO
0.9m



www.recons.org

SMARTS

Small and Moderate Aperture Research Telescope System

Image: R. Hinojosa-Goni

Where we're going...



Astrometry at the CTIO 0.9m

- Since August 1999
- Same telescope, CCD, *VRI* filters
- 800+ systems observed
- 500+ target “observing list”
ongoing observations
+ flexible targeting

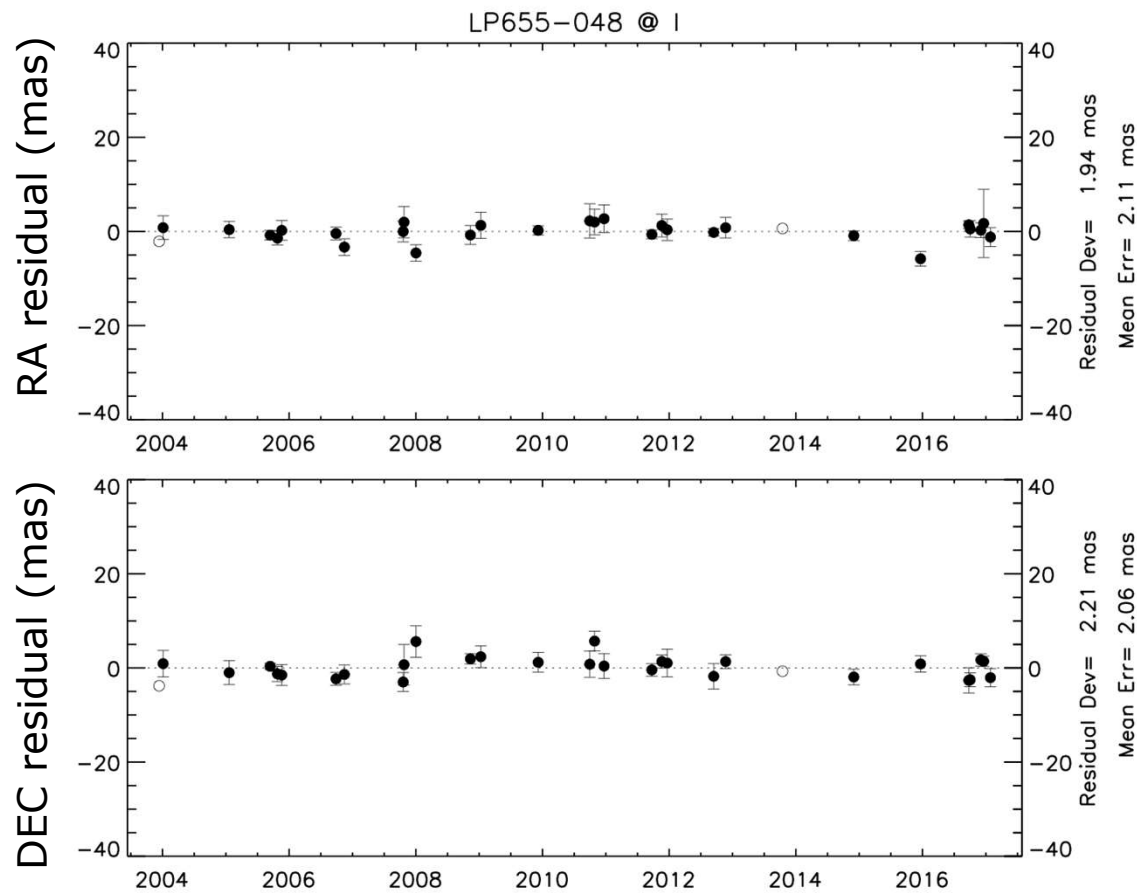
Within 25 pc?

Astrometry + Photometry +
Spectroscopy (1.5m)

Distance, Proper Motion,
H-R diagram position

Astrometry at the CTIO 0.9m: Results

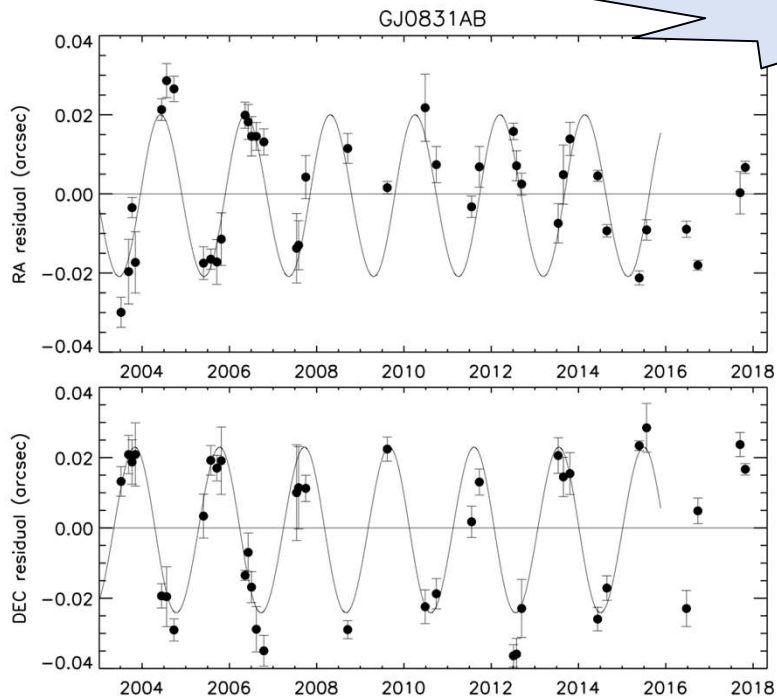
Flat line



solved for parallax
and
proper motion

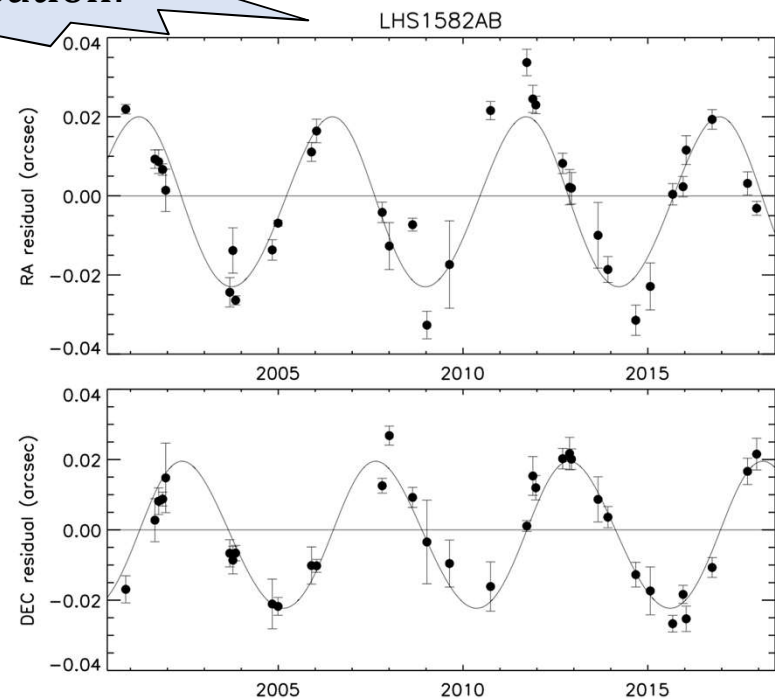
Astrometry at the CTIO 0.9m: Orbits

Perturbation!



$P = 1.94 \pm 0.01$ years

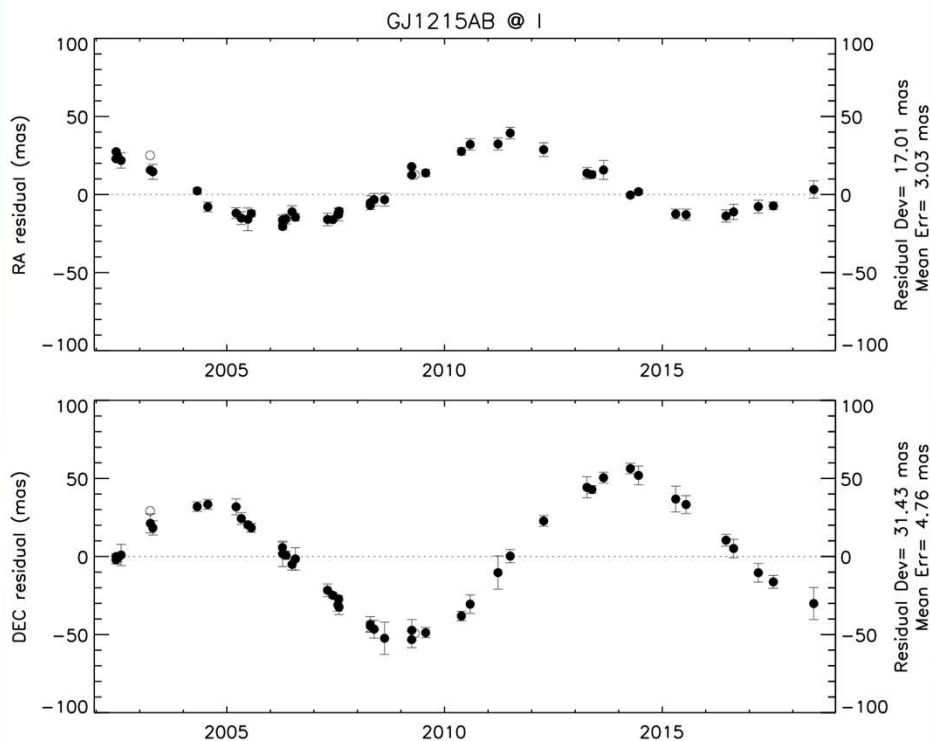
7.7 pc
M4.0



$P = 5.24 \pm 0.04$ years

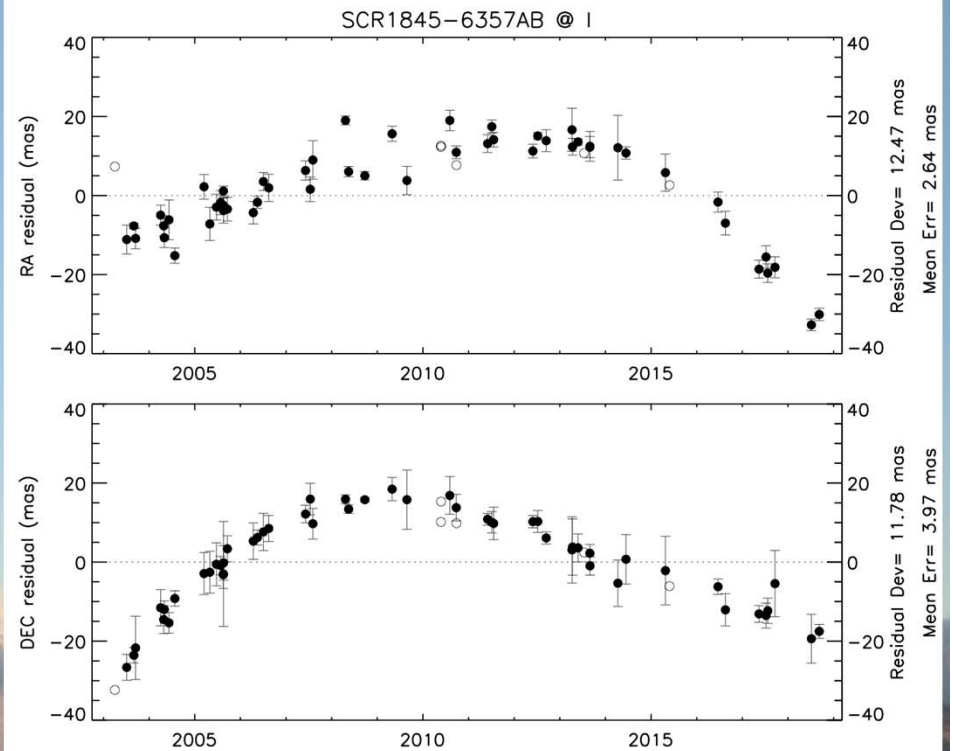
20.4 pc
M4.5

Brown Dwarf Astrometry at the CTIO 0.9m: ^ Orbits



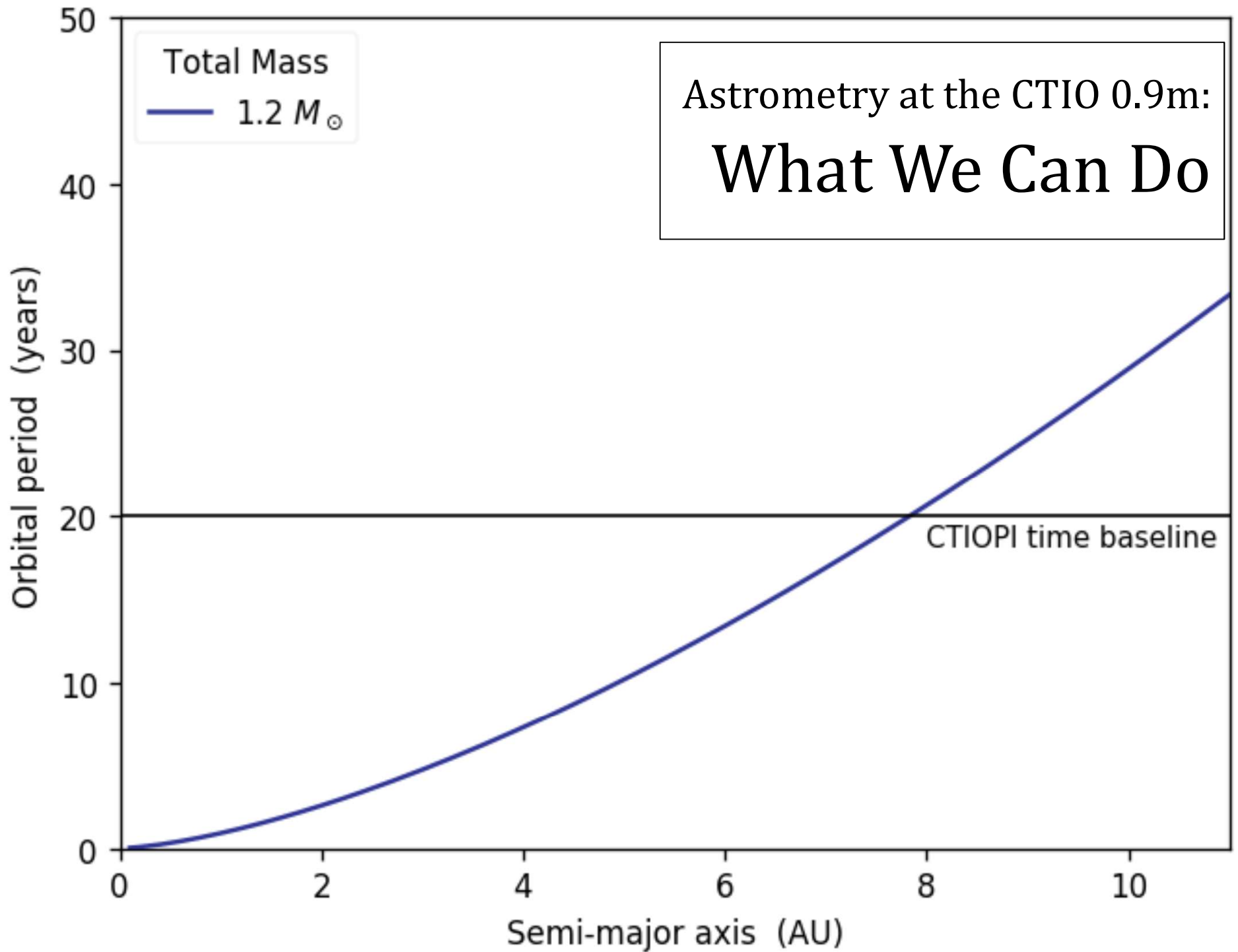
$P = 9.86 \pm 0.10$ years

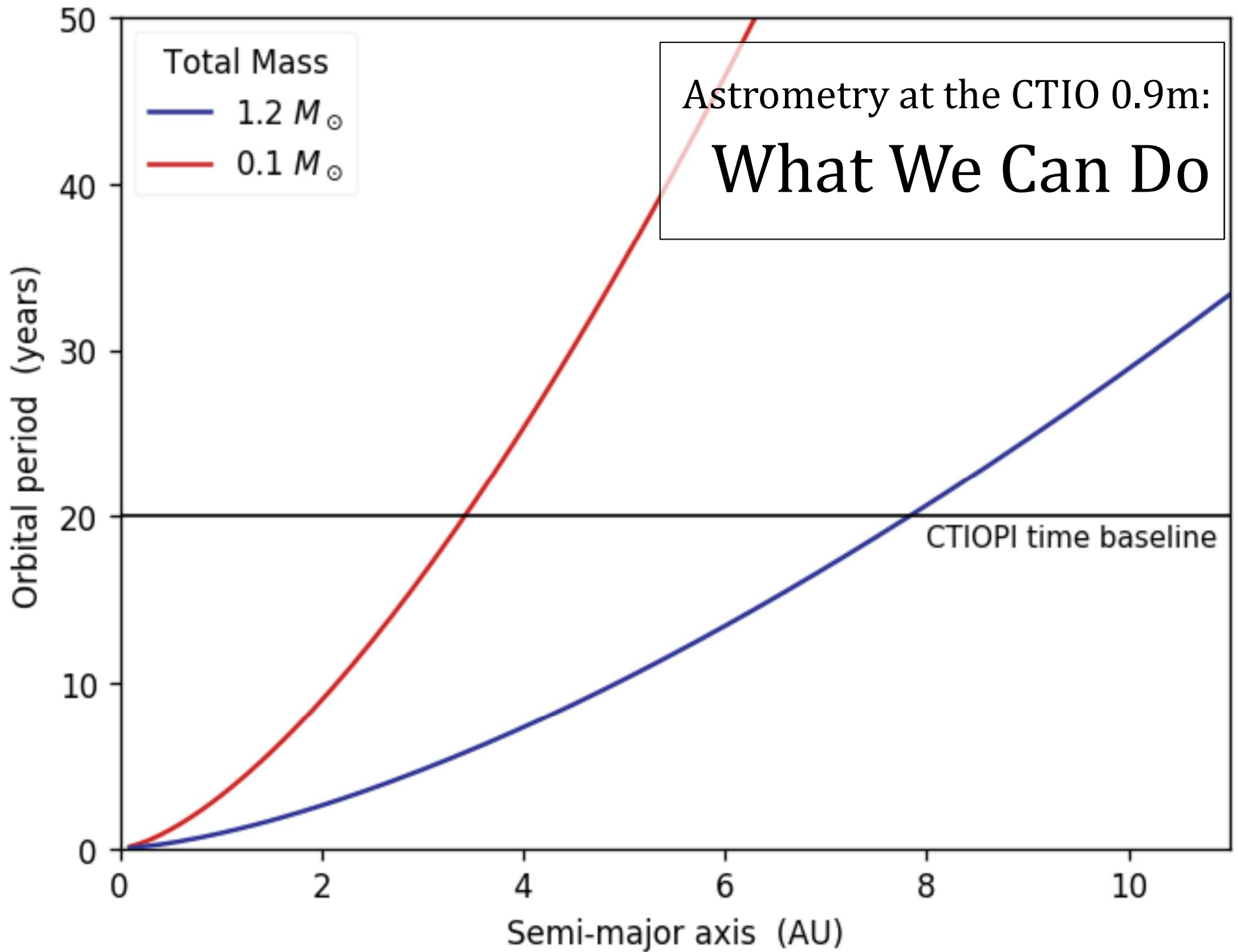
12.5 pc
M5.0 star + brown dwarf companion

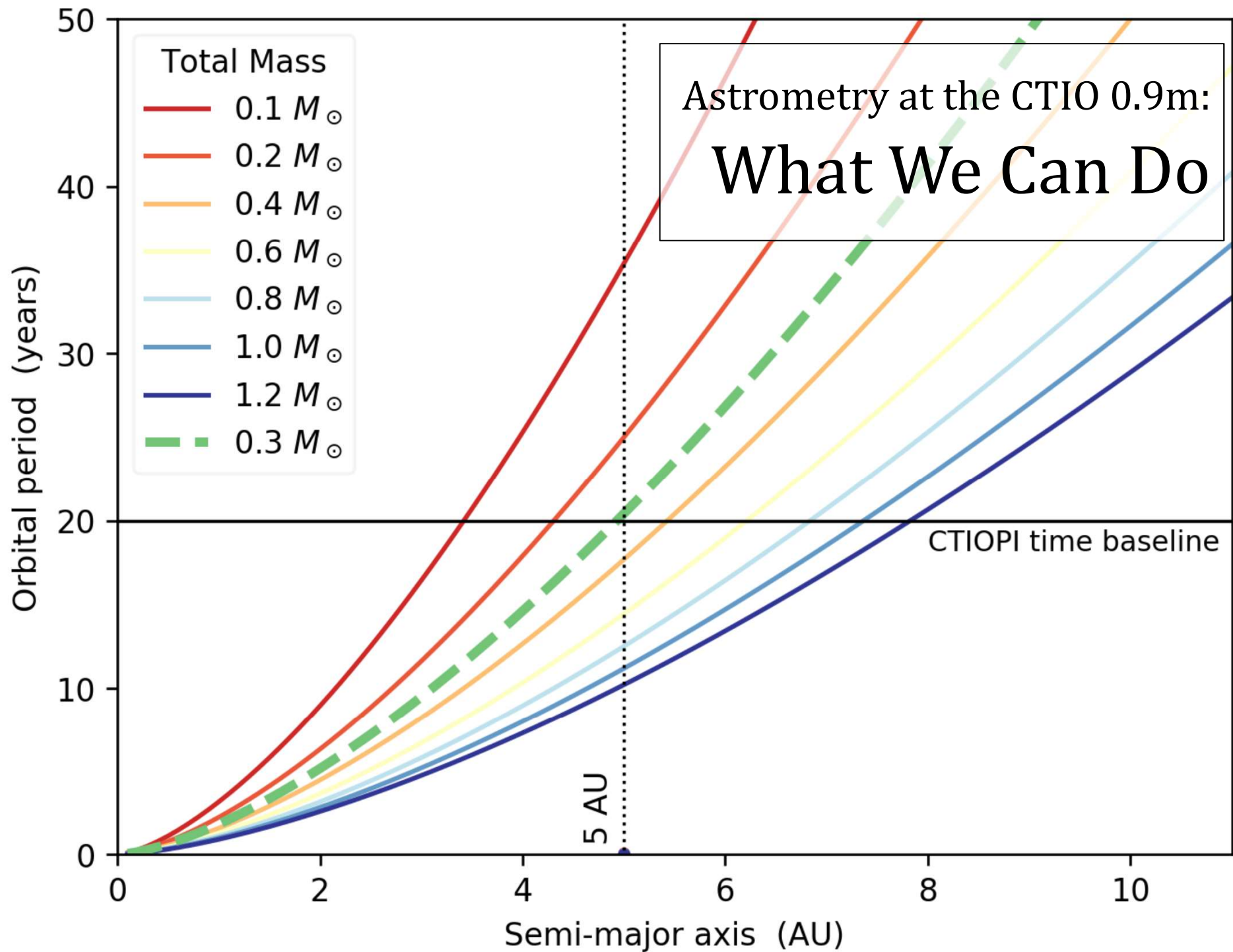


$P > 15$ years

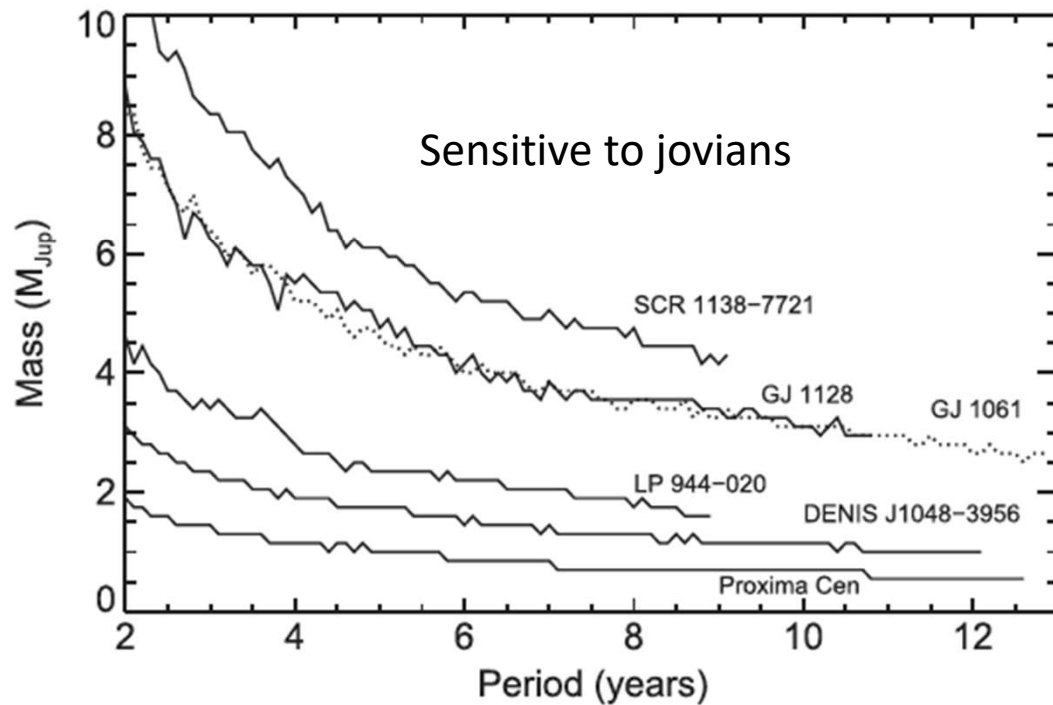
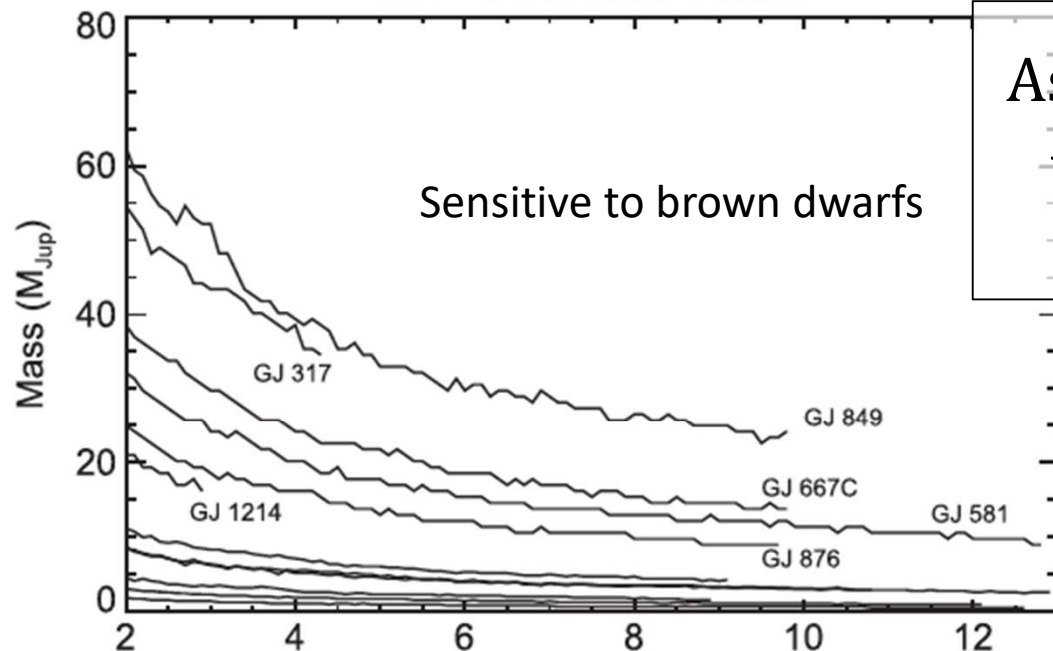
4.0 pc
M8.5V star + brown dwarf companion







90% Detection Rates

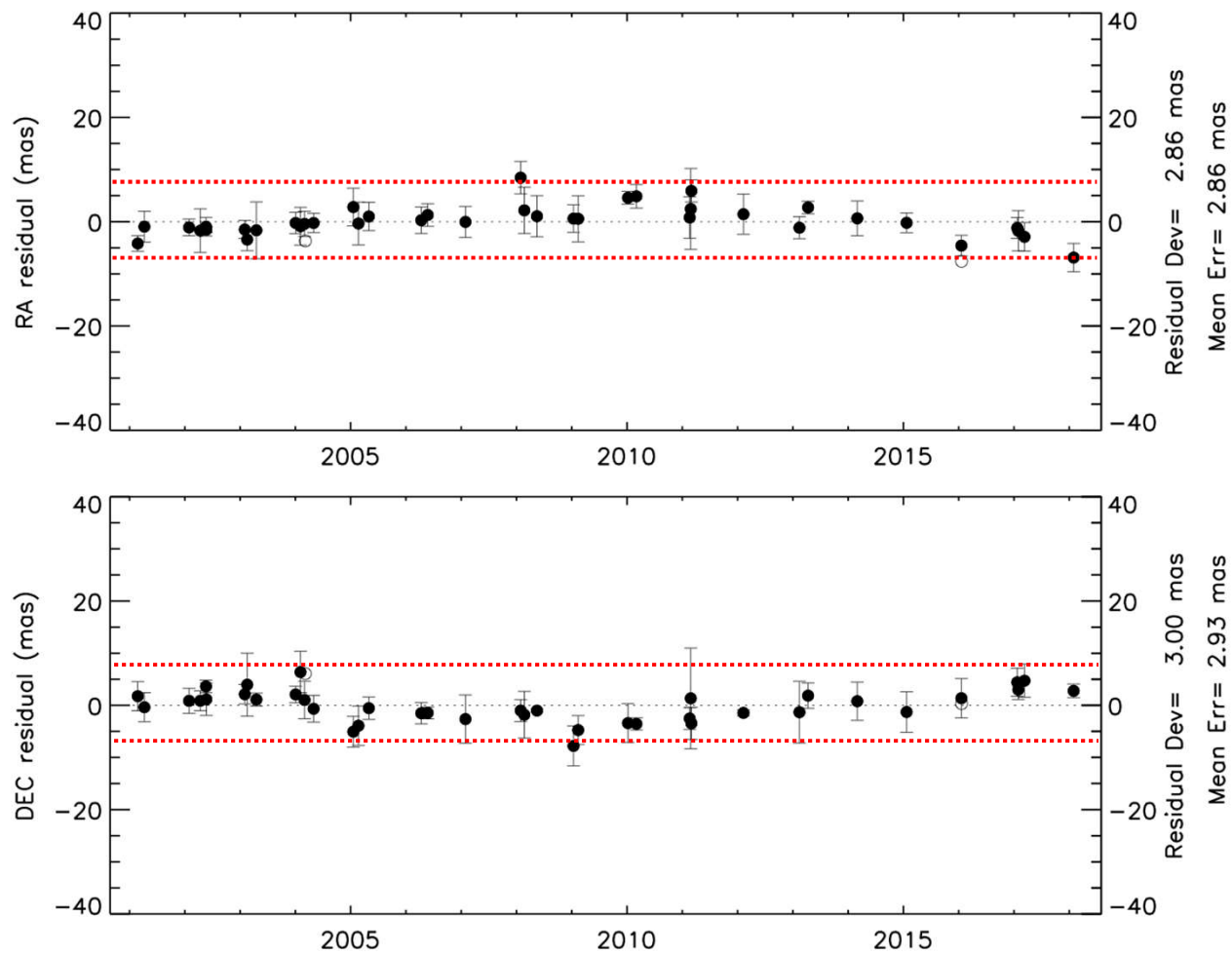


Astrometry at the CTIO 0.9m:
What We Can Do

Lurie et al. (2014)

Astrometry at the CTIO 0.9m: ^ Orbits

Jovian??

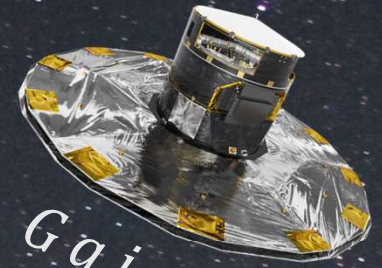


Within 5 pc
Late M star

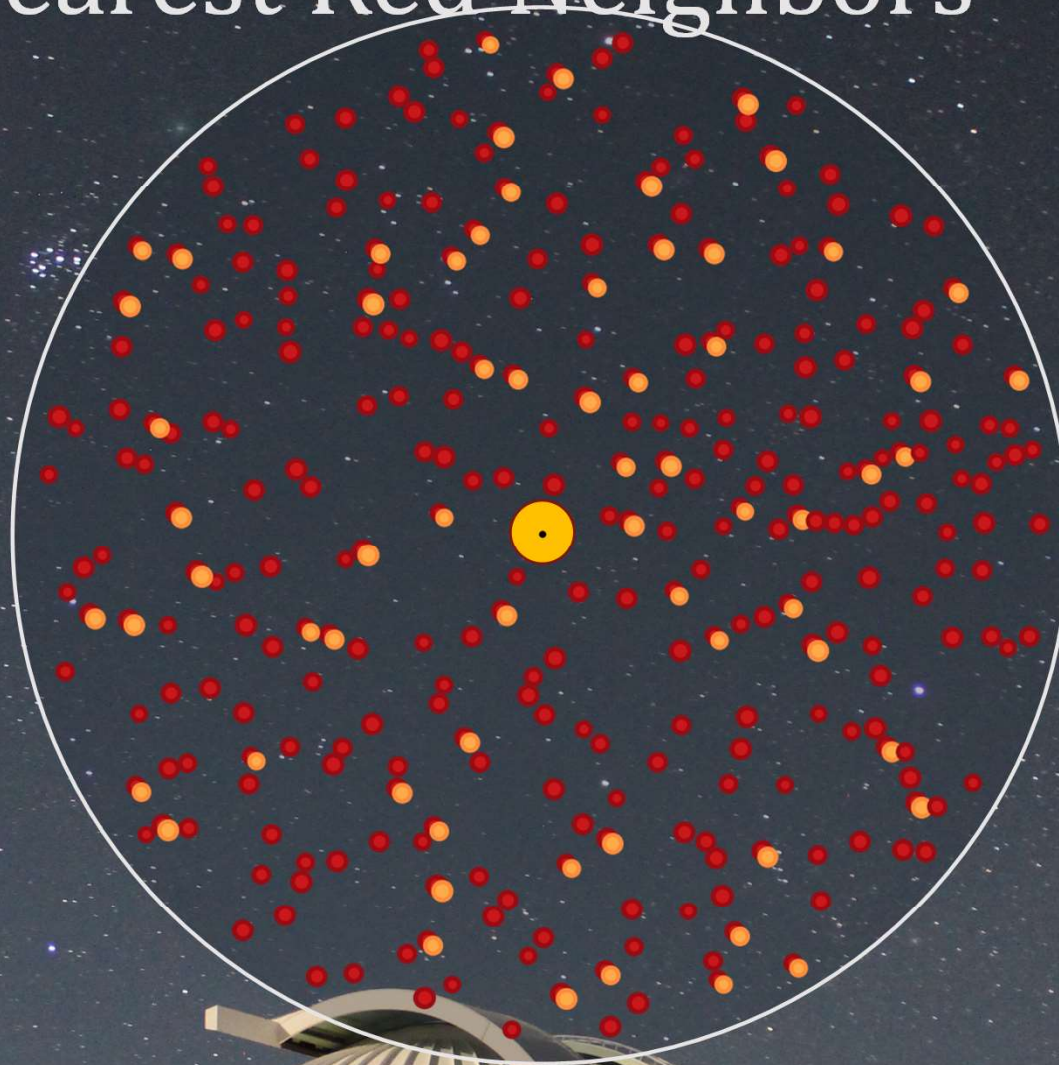
P = 12 years??

$0.08 M_{\odot}$
+
 $1 M_{\text{Jup}}$

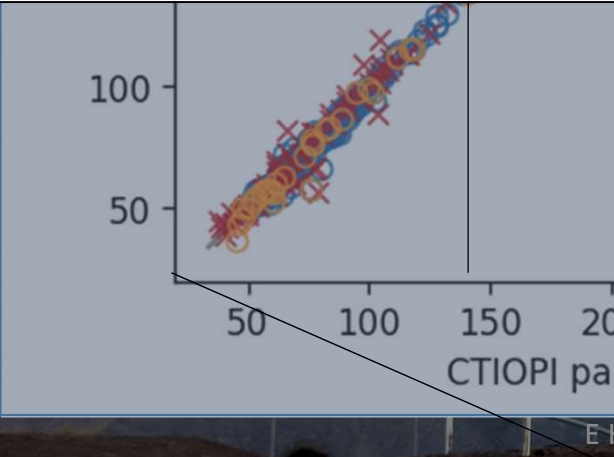
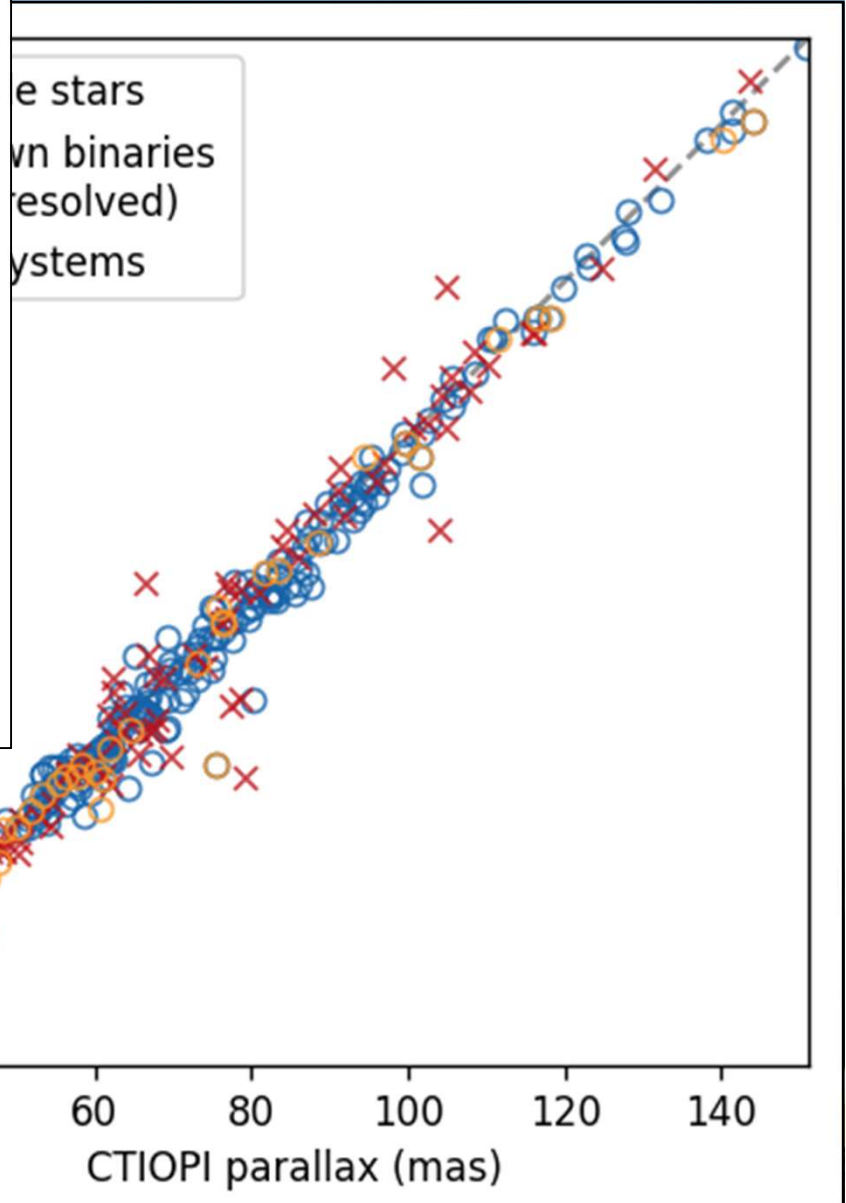
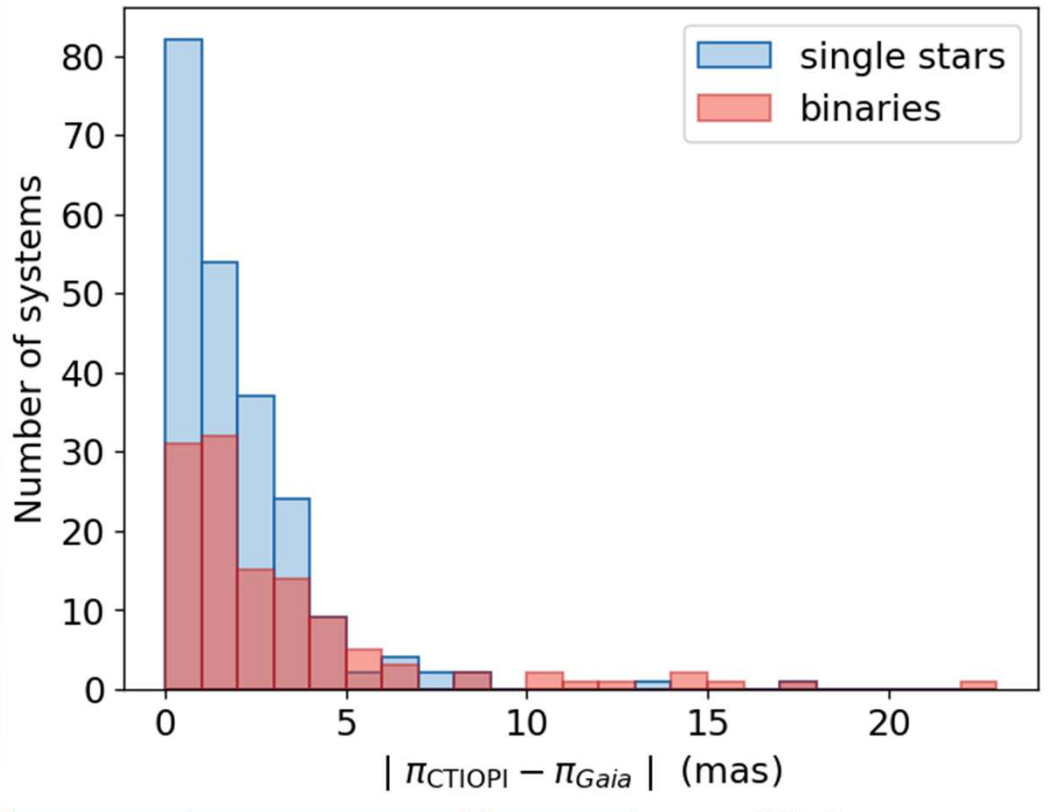
Our Nearest Red Neighbors



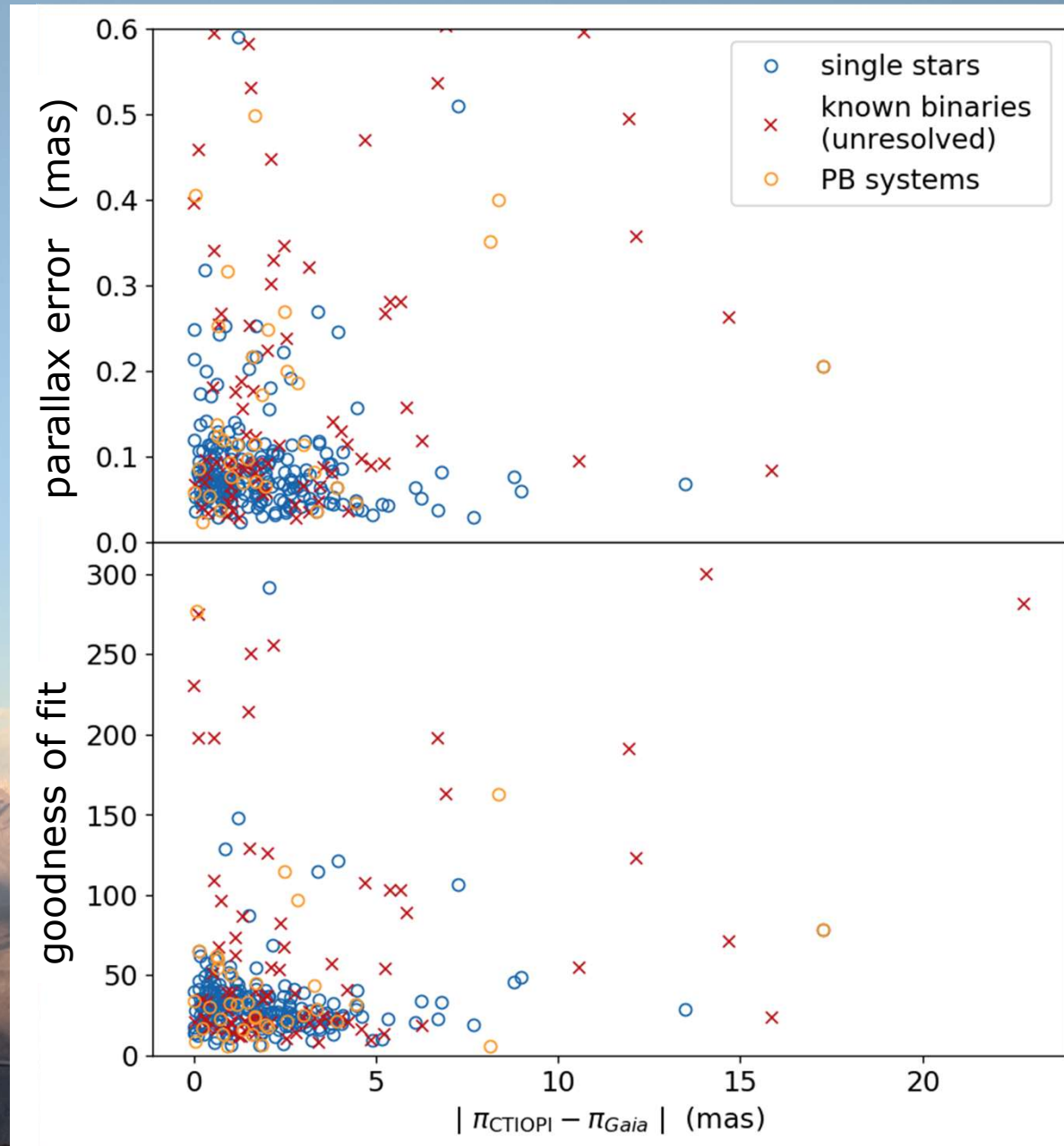
Gaia?



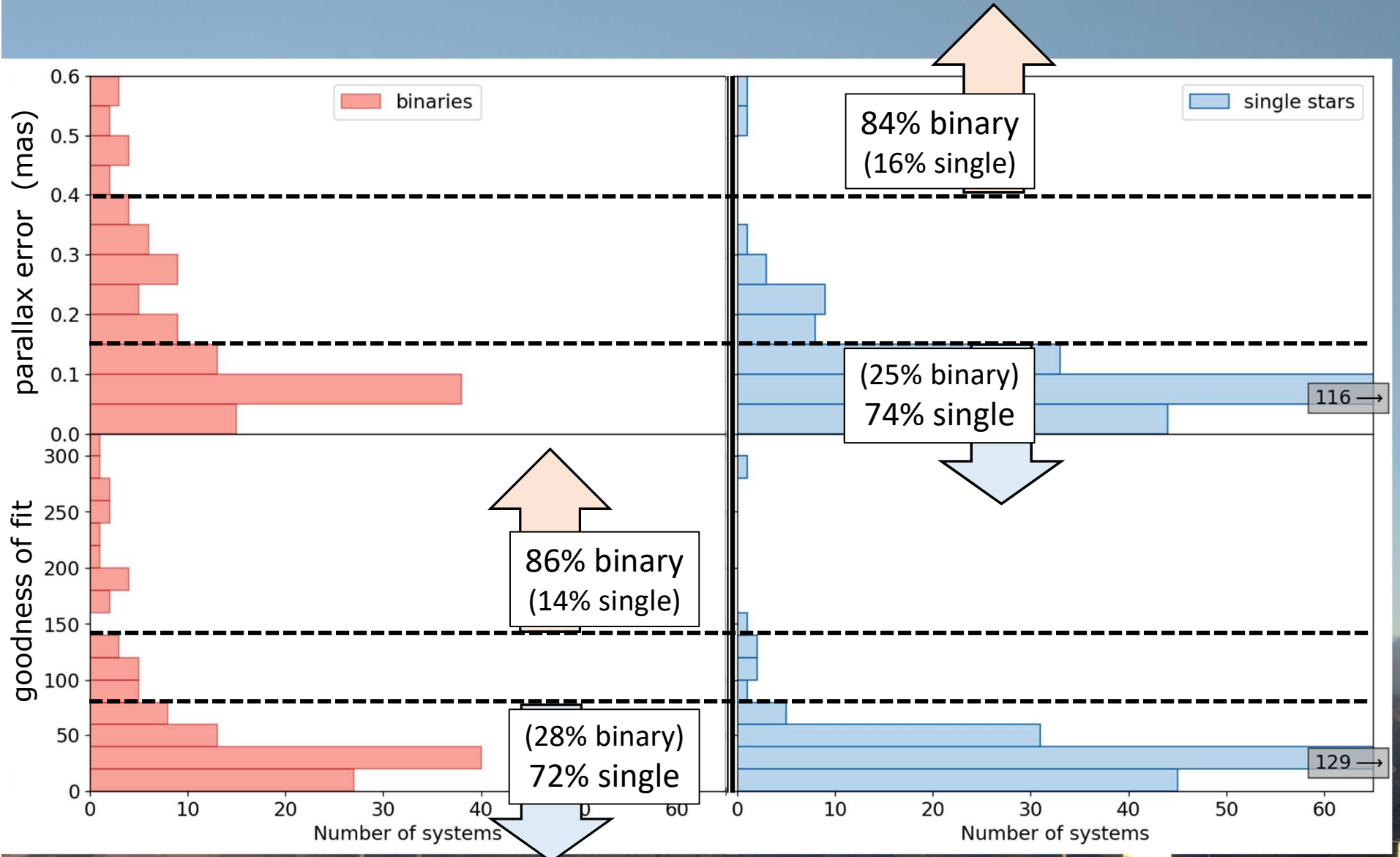
Astrometry at the CTIO 0.9m: Next Steps with *Gaia*



Astrometry at the CTIO 0.9m: Next Steps with *Gaia*

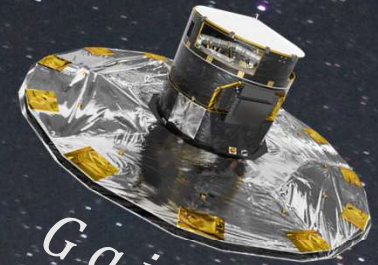
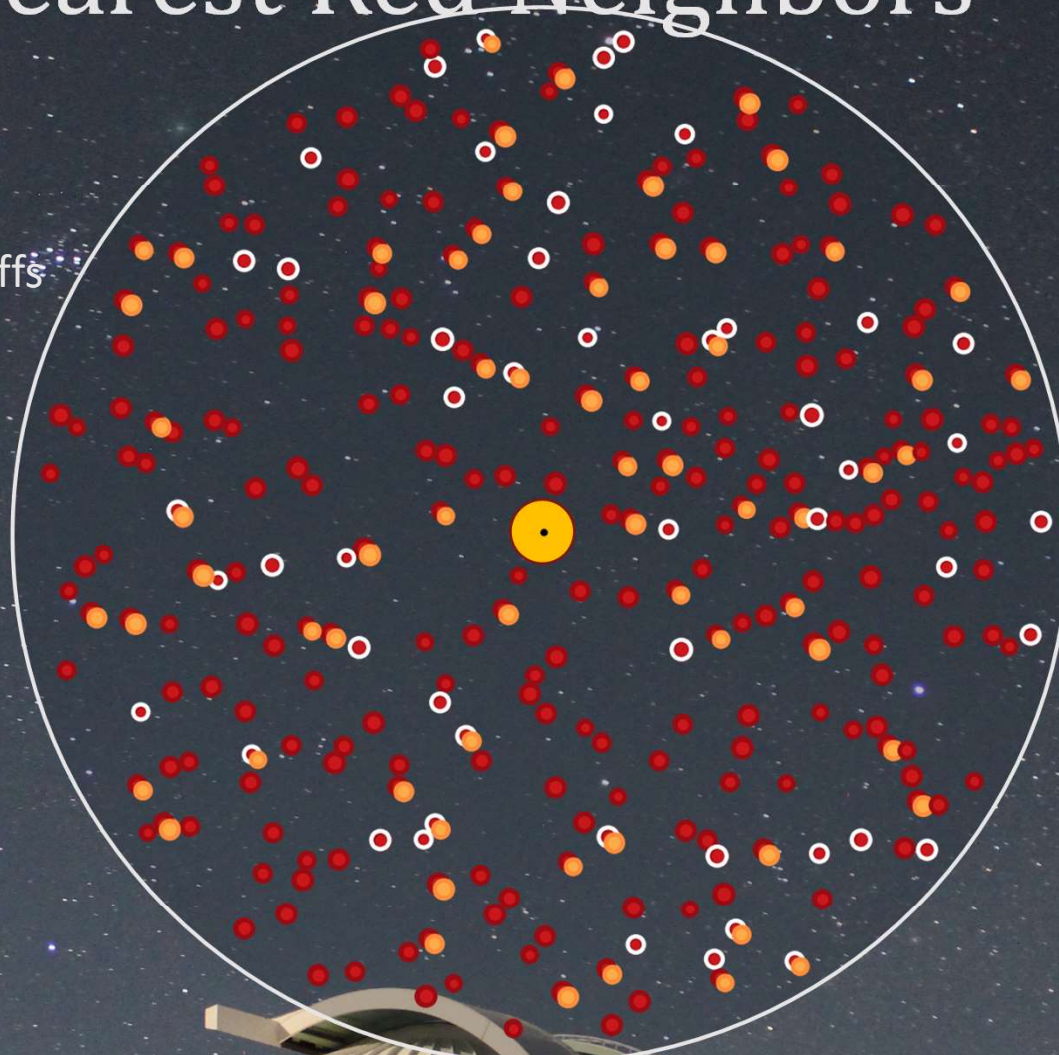


Astrometry at the CTIO 0.9m: Next Steps with *Gaia*



Our Nearest Red Neighbors

17% violate
at least two cutoffs



Gaia

Here's how we can help...

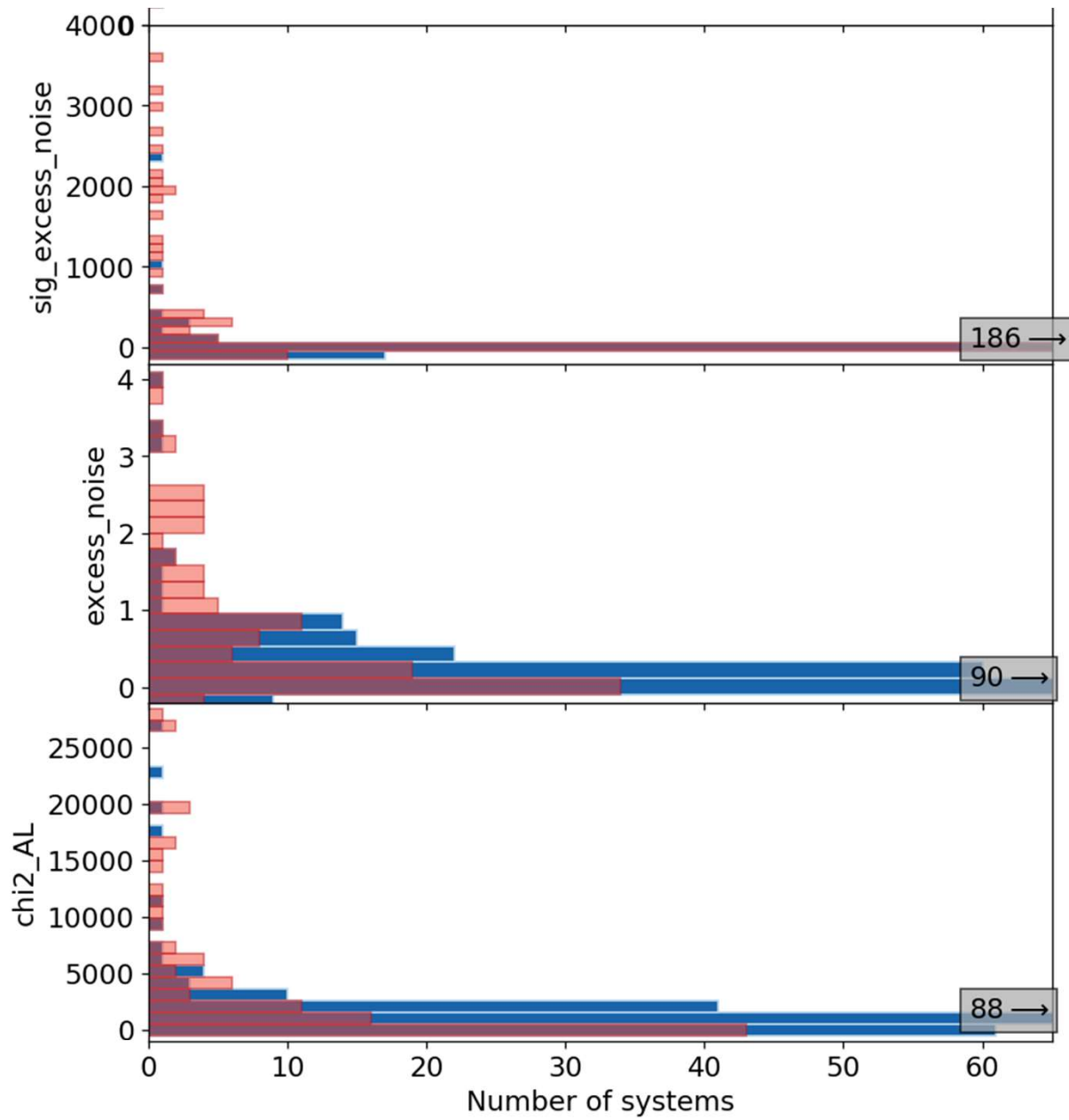
- Deep data sets on nearby red dwarfs
- We know where the binaries are hiding in the *Gaia* data



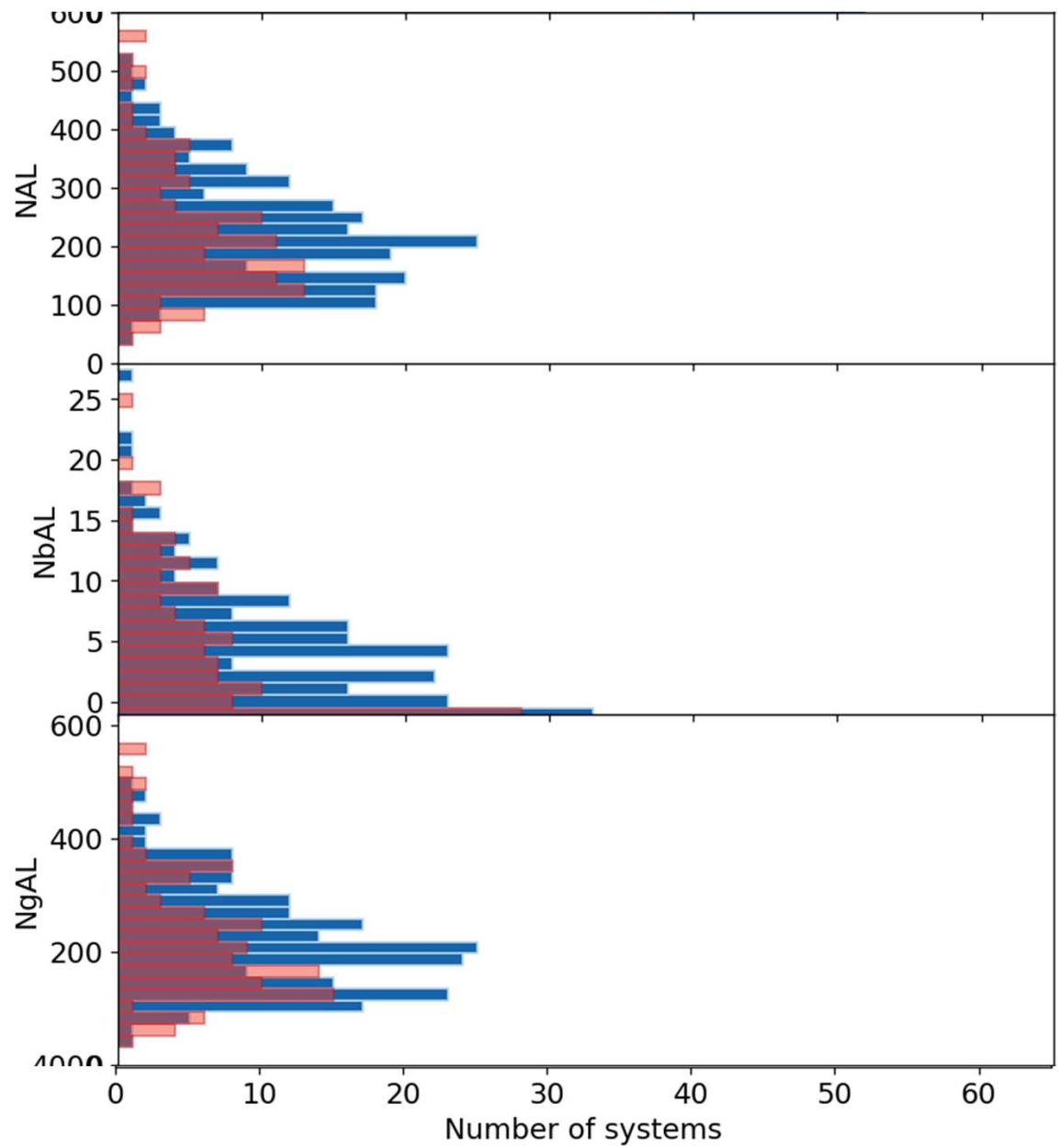
Image: Maggie Masetti

E.H. Vrijmoet // RECONS & Gaia Astrometry + WST

Additional material



Additional material



Additional material

