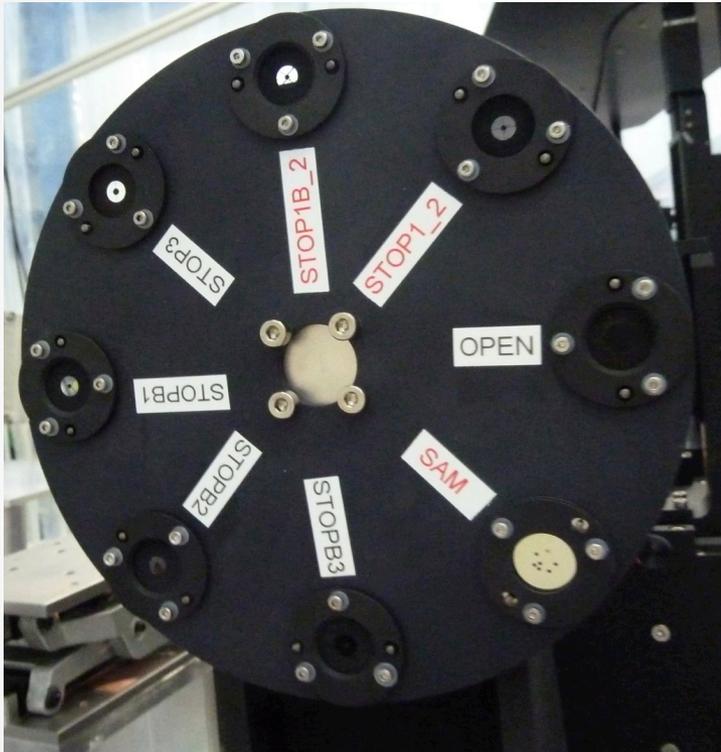


Aperture masking (and planet formation ?)

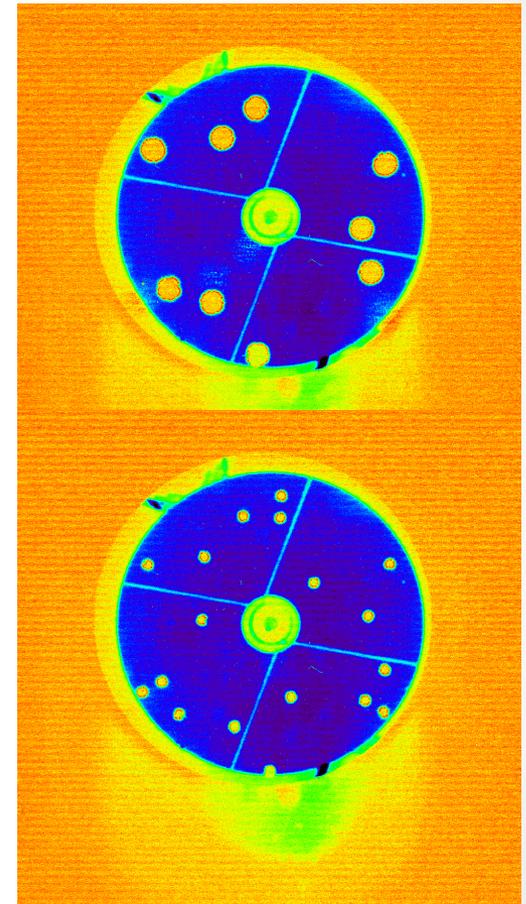
Sylvestre Lacour

Aperture Masking



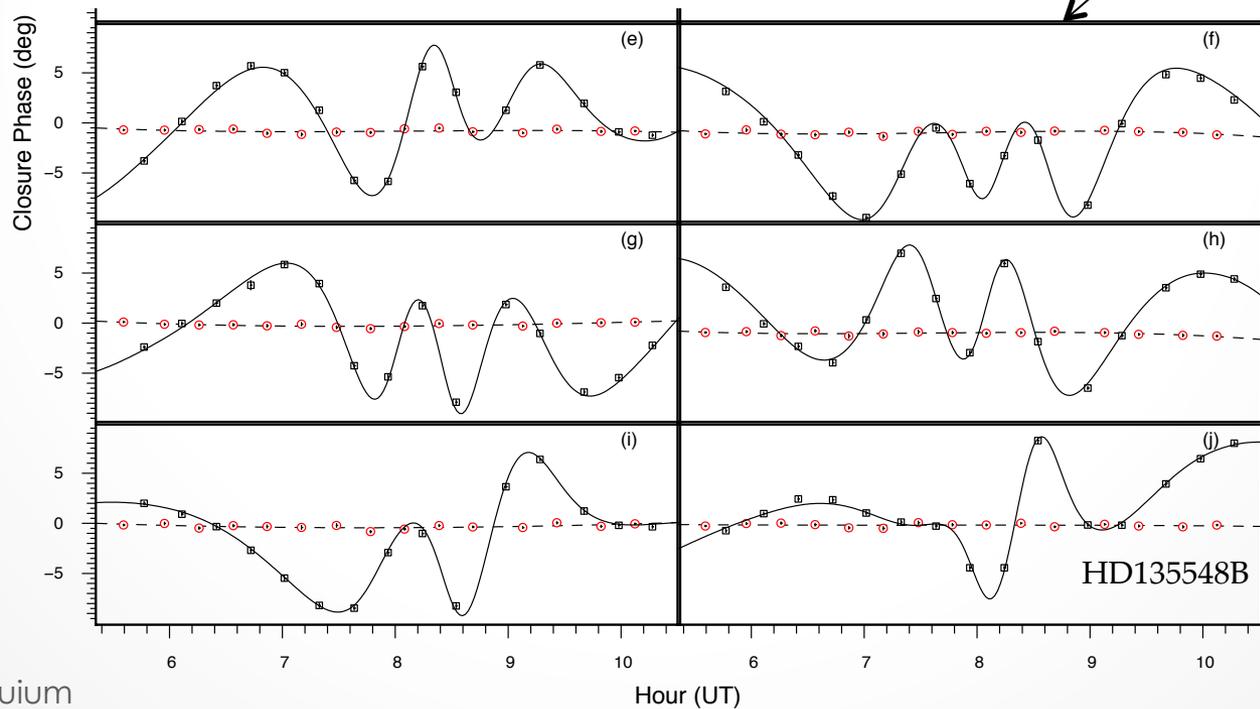
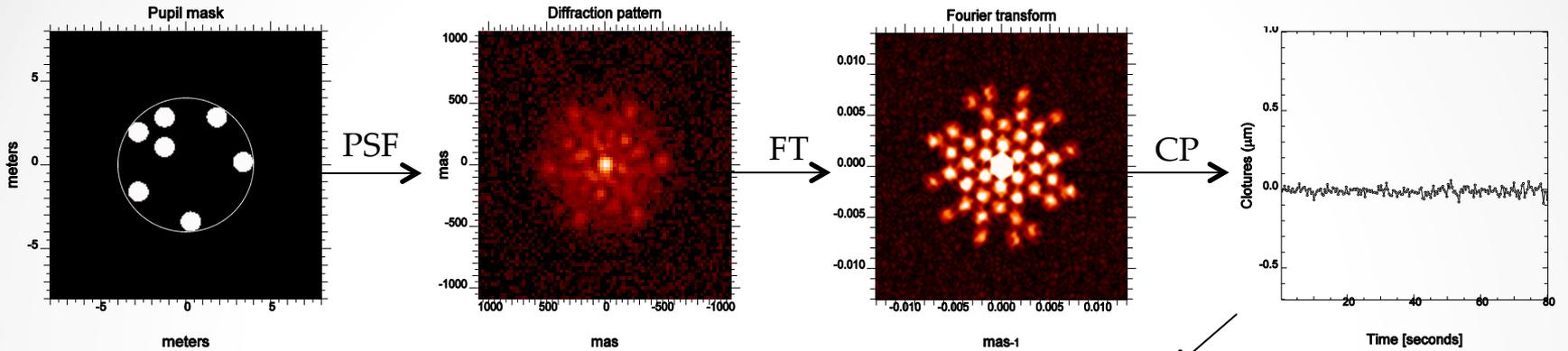
Pupil wheel on SPHERE

PALOMAR
KECK
GEMINI
SUBARU
VLT
LBT
JWST
E-ELT

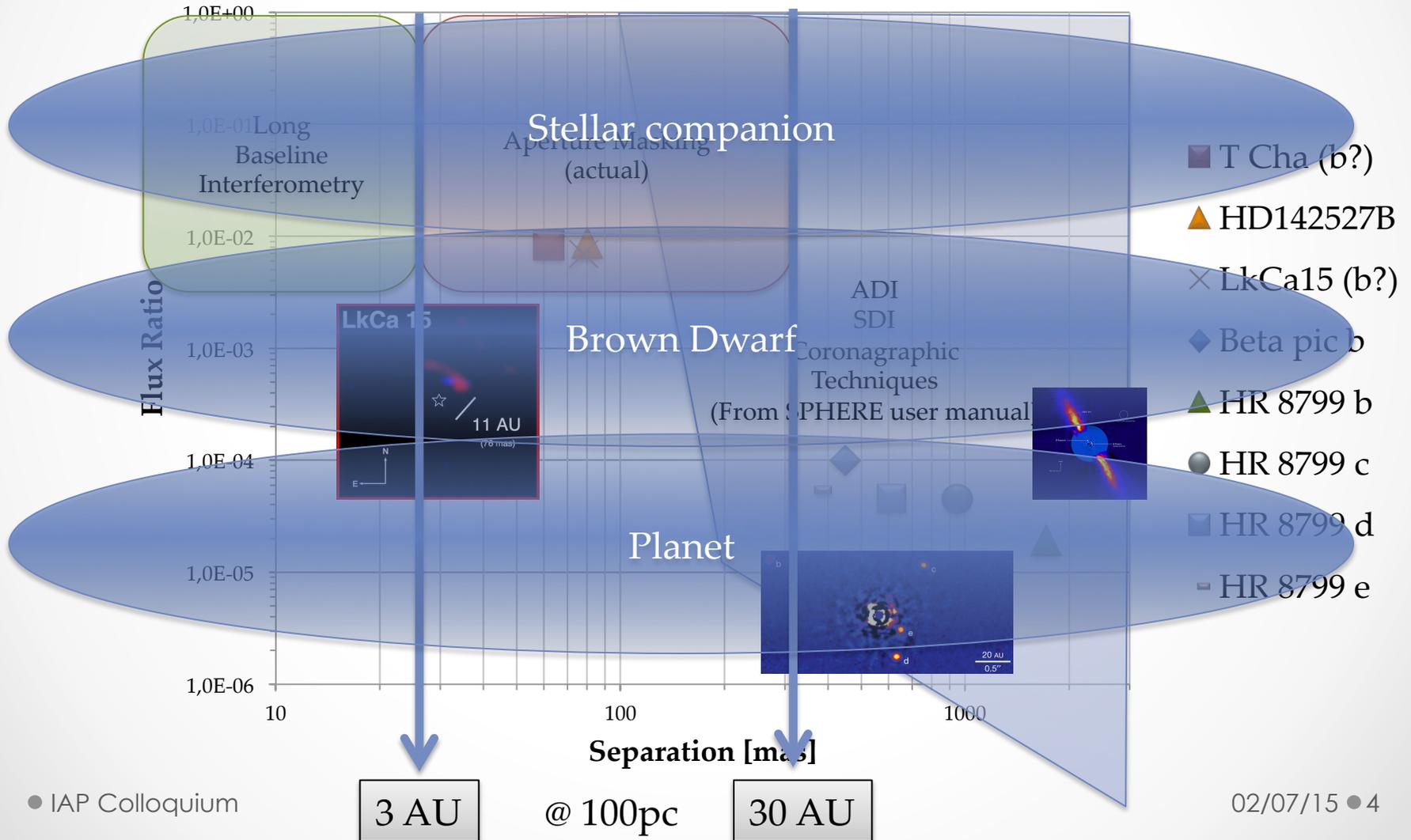


Pupil images from NACO

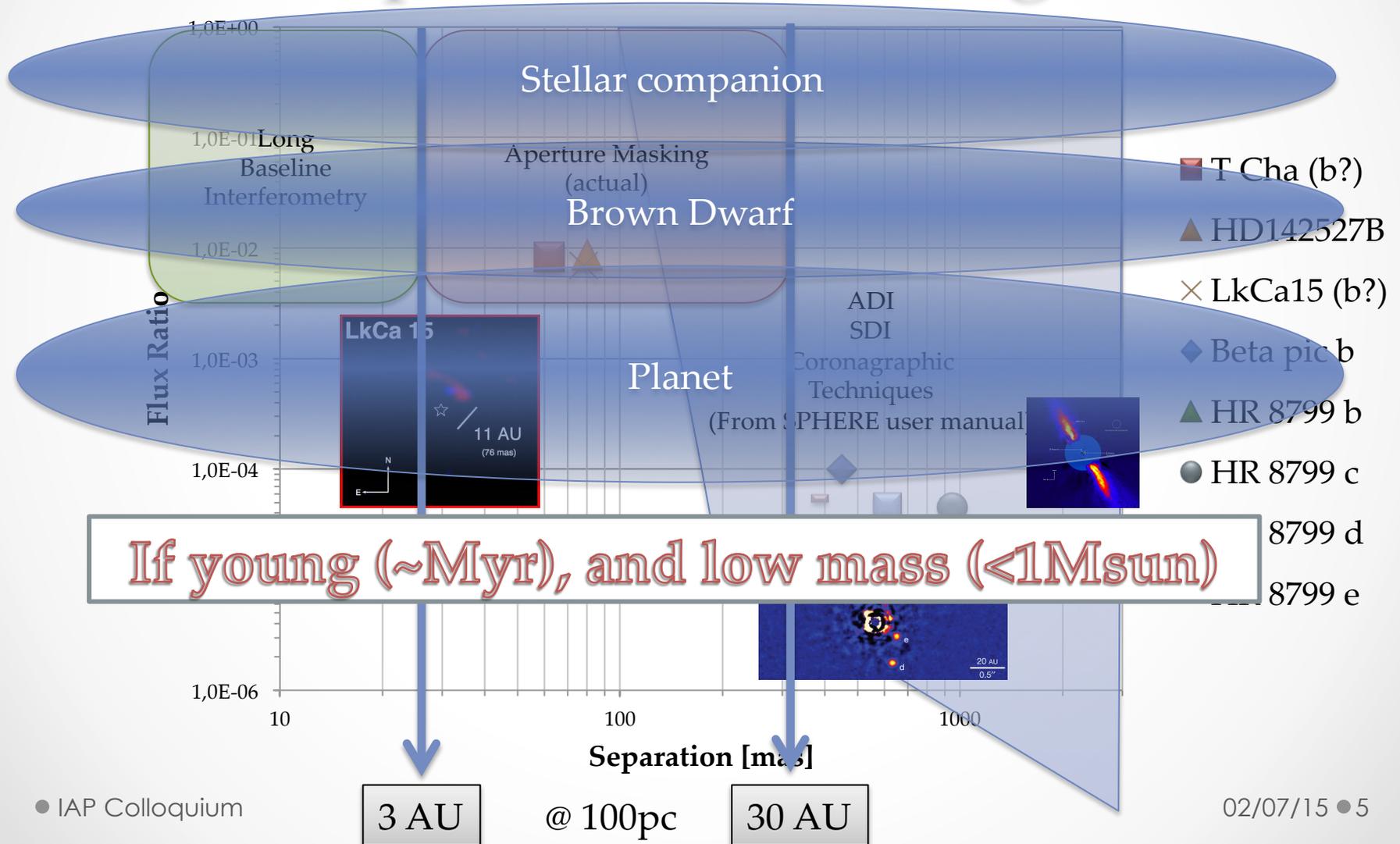
Principle



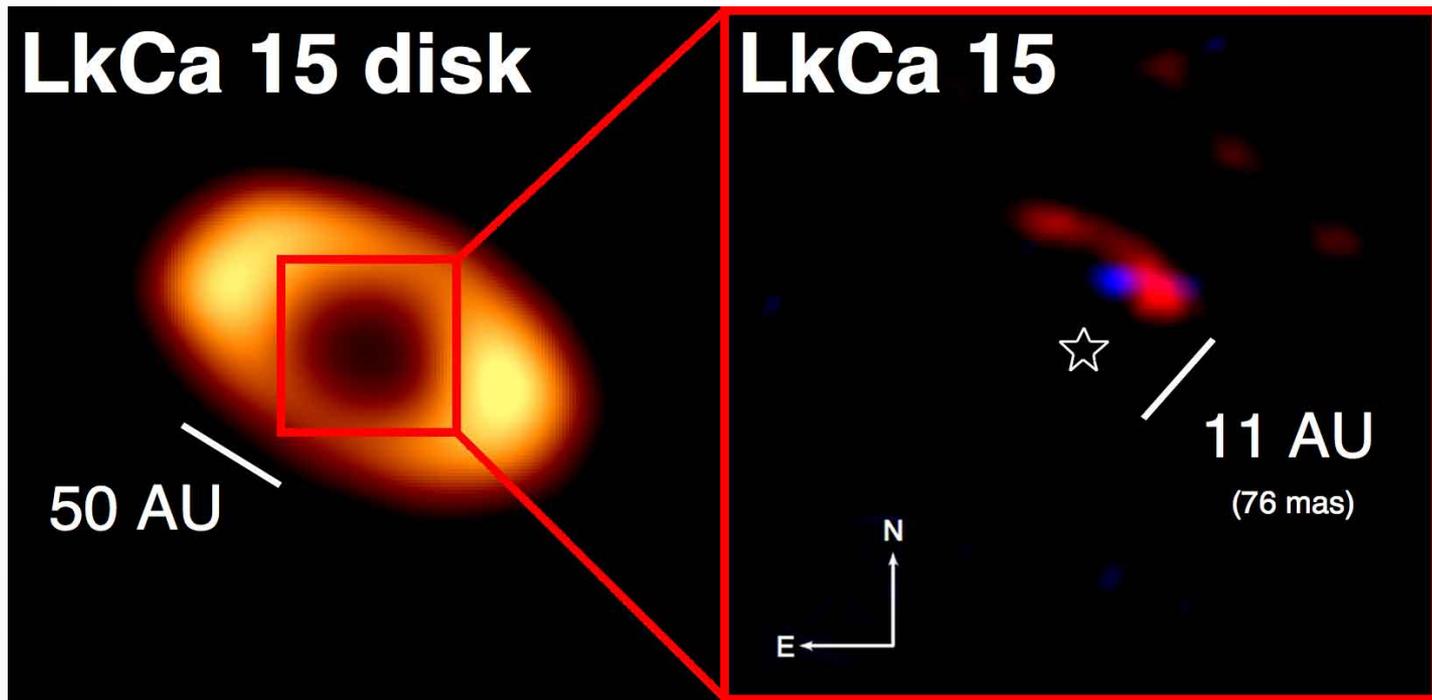
The observational window of aperture masking



The observational window of aperture masking



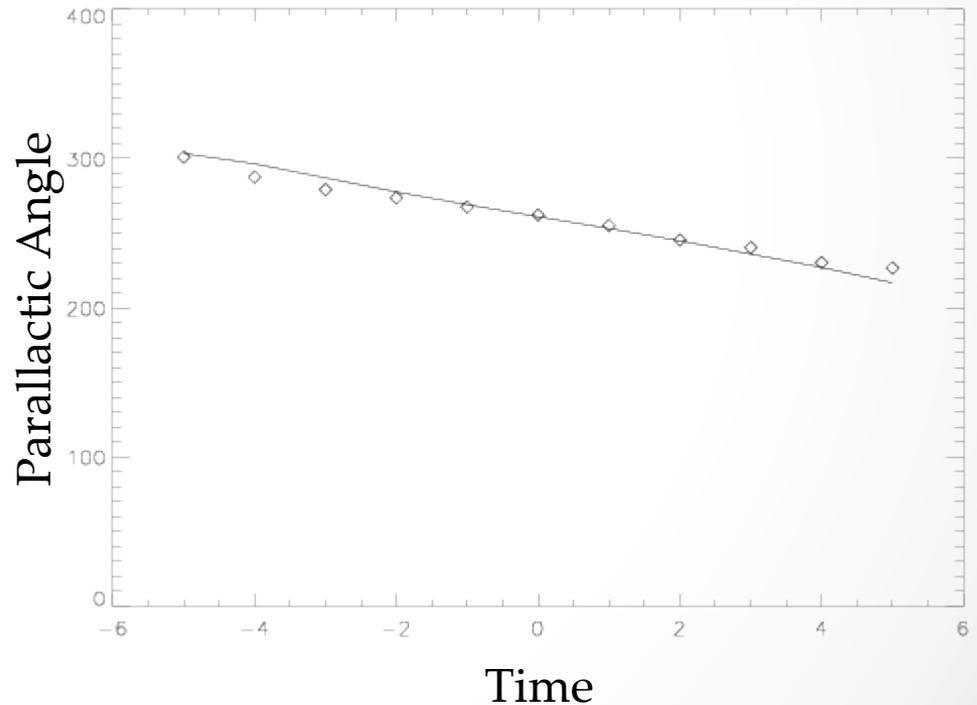
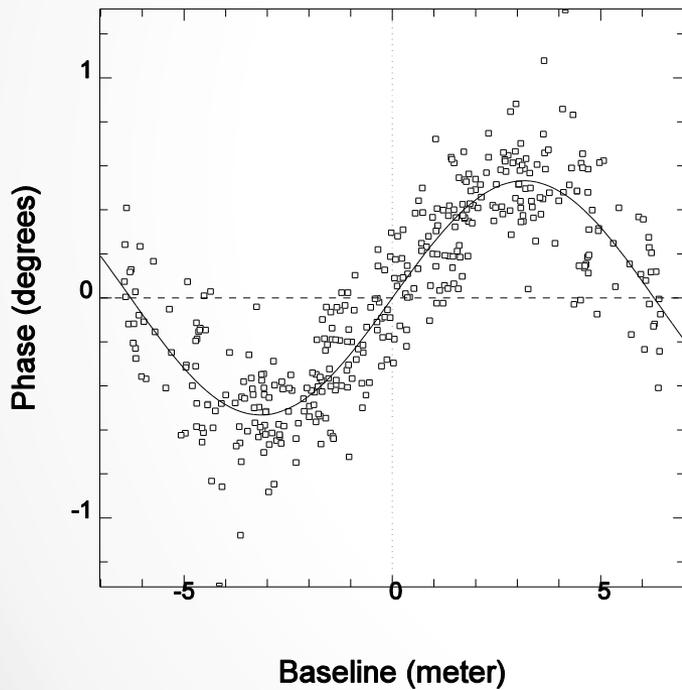
LkCa 15



Kraus & Ireland, 2011

T Cha

- 2011: Huelamo et al., discovery of non-stellar emission close to the star



Separation: $62 \pm 7.3 \text{ mas}$

Contrast ratio $0.92 \pm 0.2\%$

T Cha

- 2013: Olofsson et al. show that the signal can be produced by scattering of the outer disk:

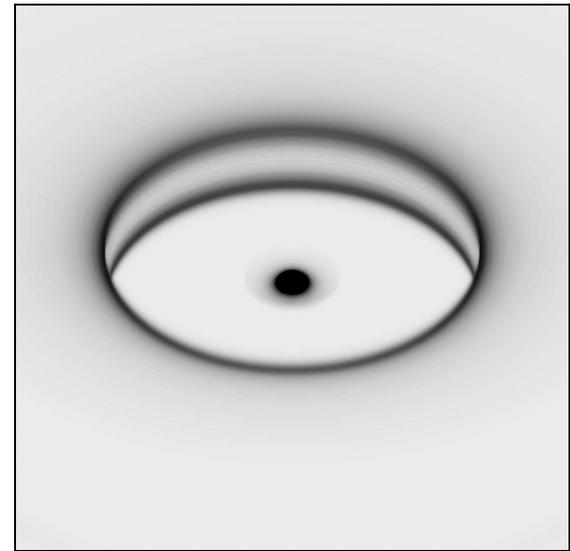
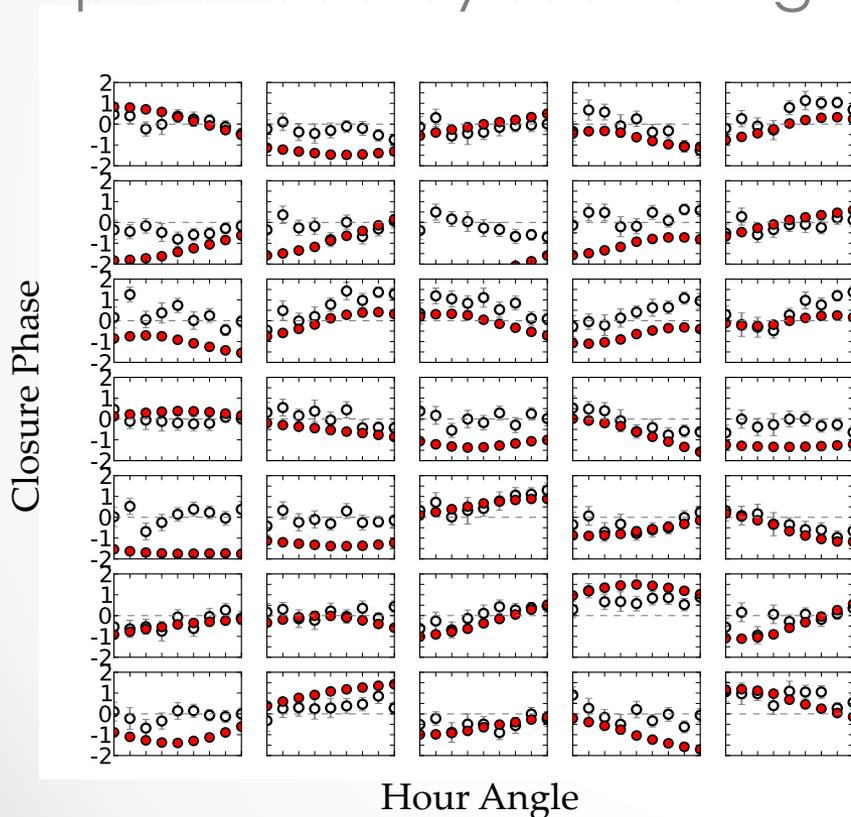
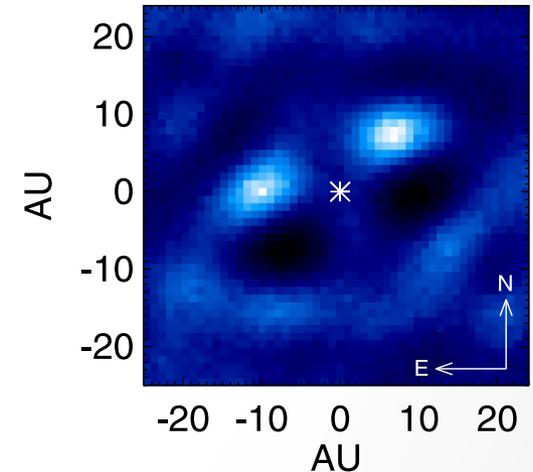
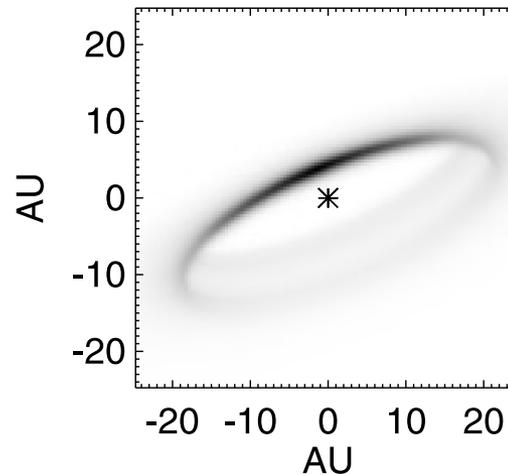
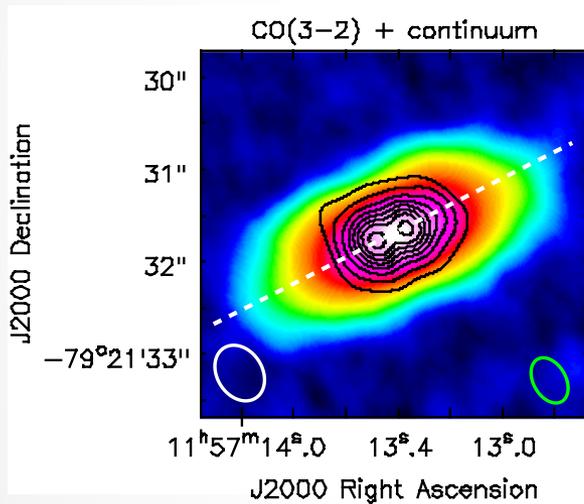


Fig. 6. Color-inverted raytraced image of the best-fit model, in the *H*-band, including a self-shadow disk extending up to 3 AU. The field of view is $250 \times 250 \text{ mas}^2$.

T Cha

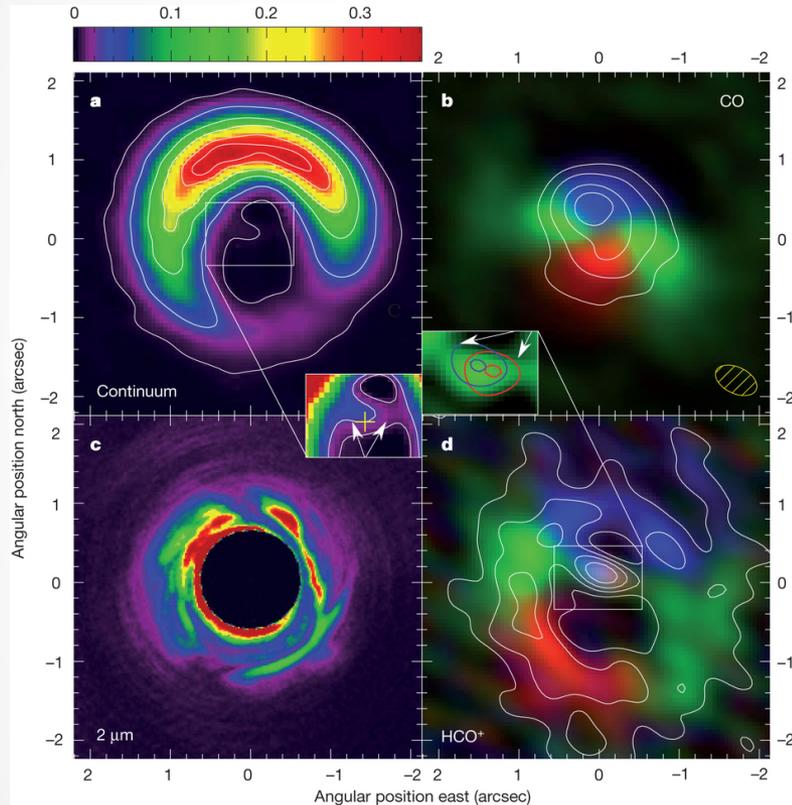
- 2015: Cheetham et al. shows that image reconstruction favour the disk hypothesis



ALMA data (Huelamo et al. 2015)

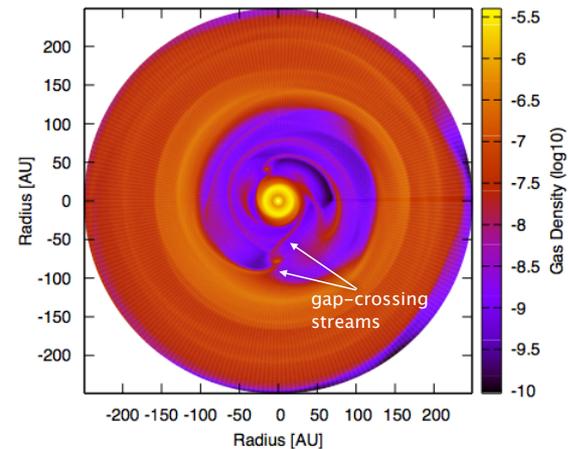
K-band image reconstruction
from SAM data

HD142527



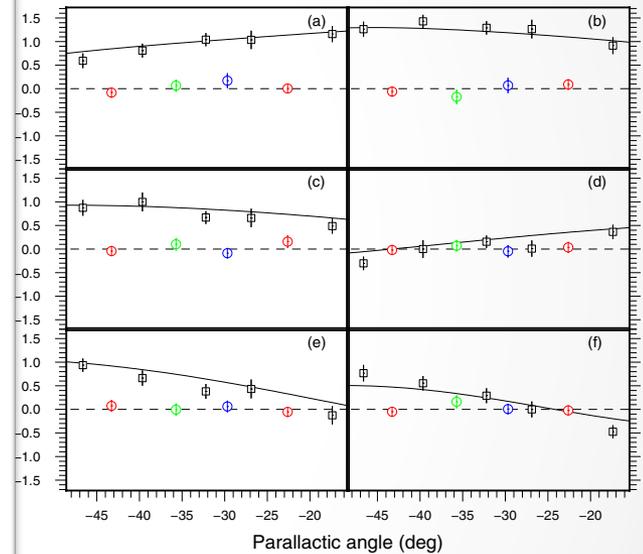
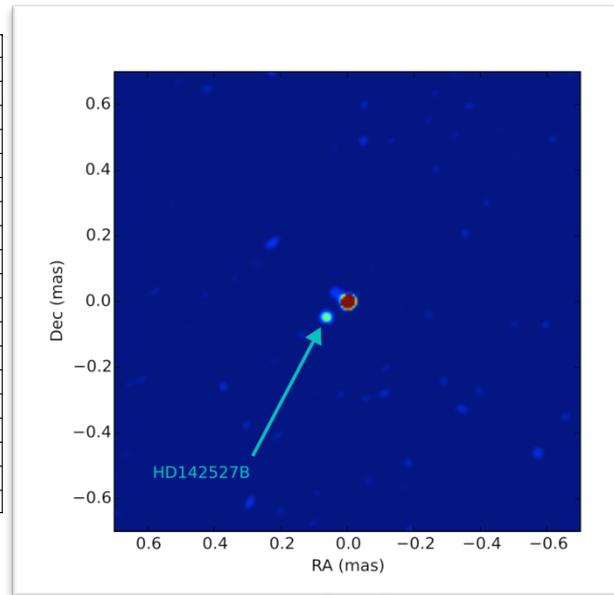
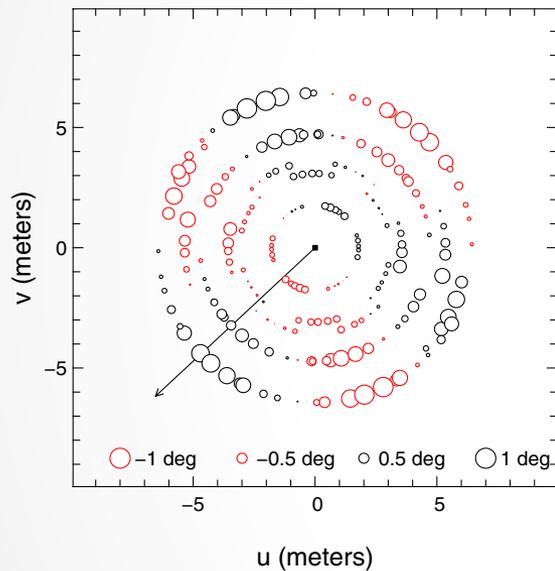
ALMA, Casassus et al. 2013

- Core accretion ?
Or
- Gravitational instabilities ?
Or
- A mixture of both ?



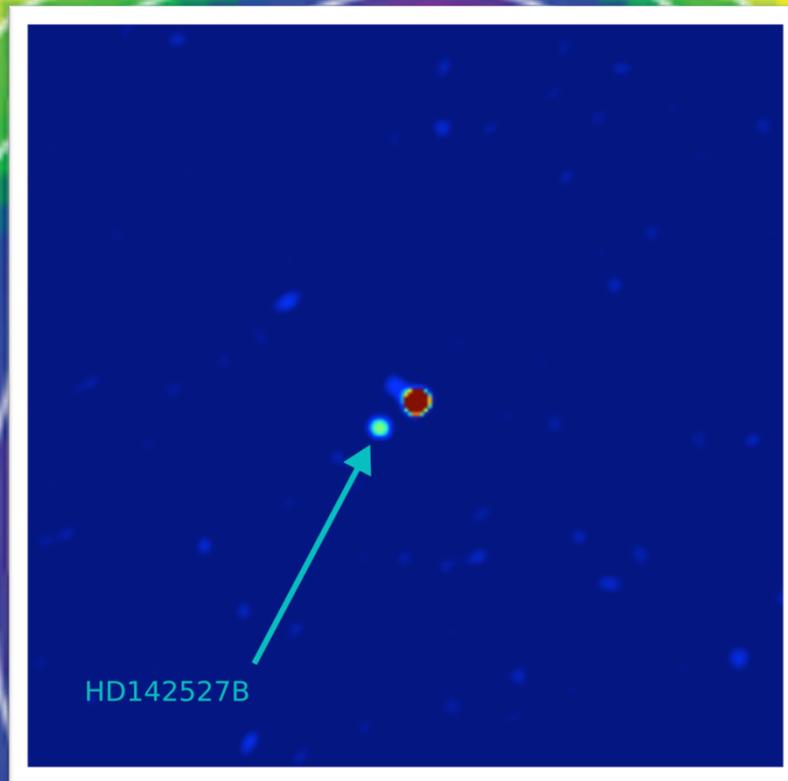
Simulation of accreting planets

HD142527



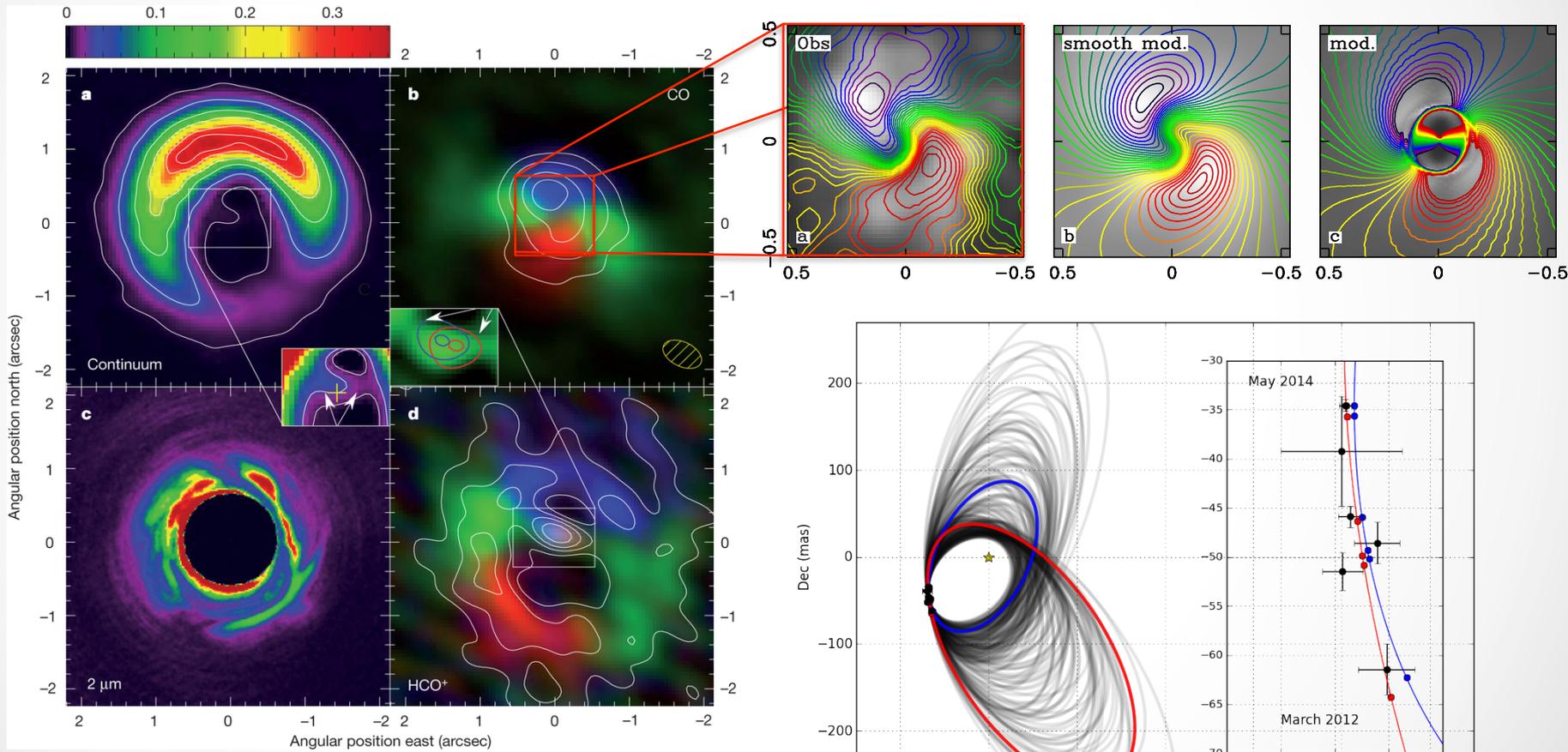
HD142527 Dataset (Biller et al. 2012)

HD142527

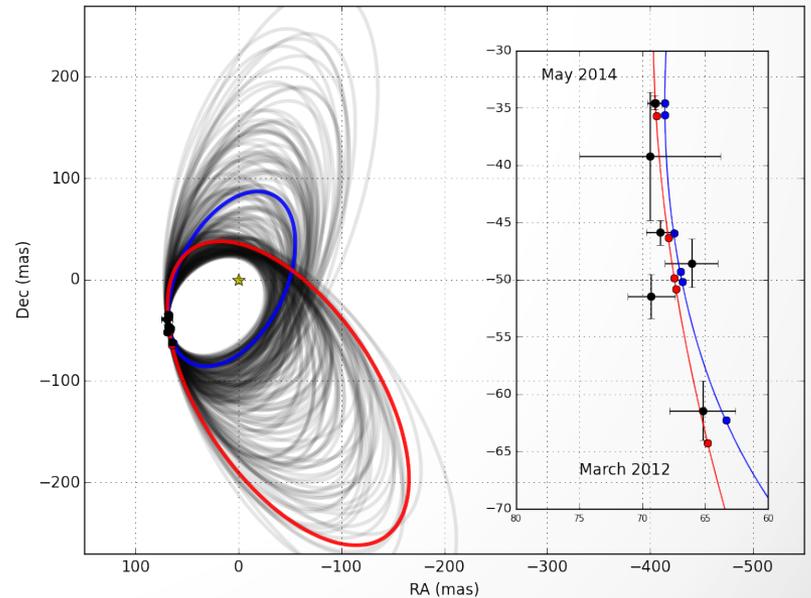


HD142527

HD142527, ALMA data, 2014

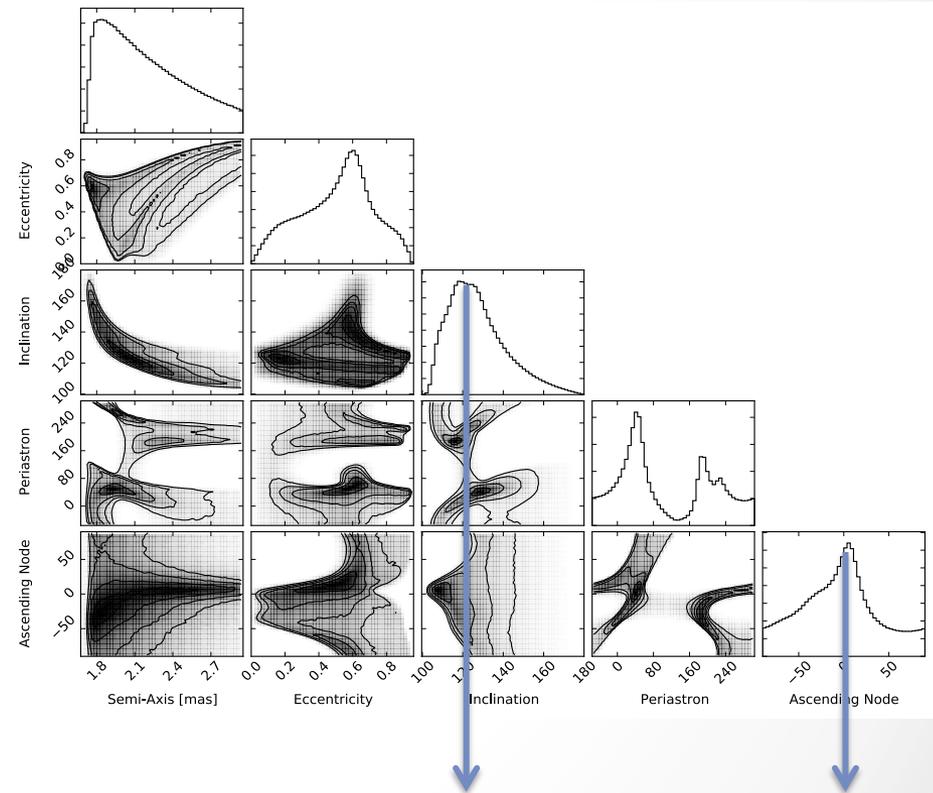
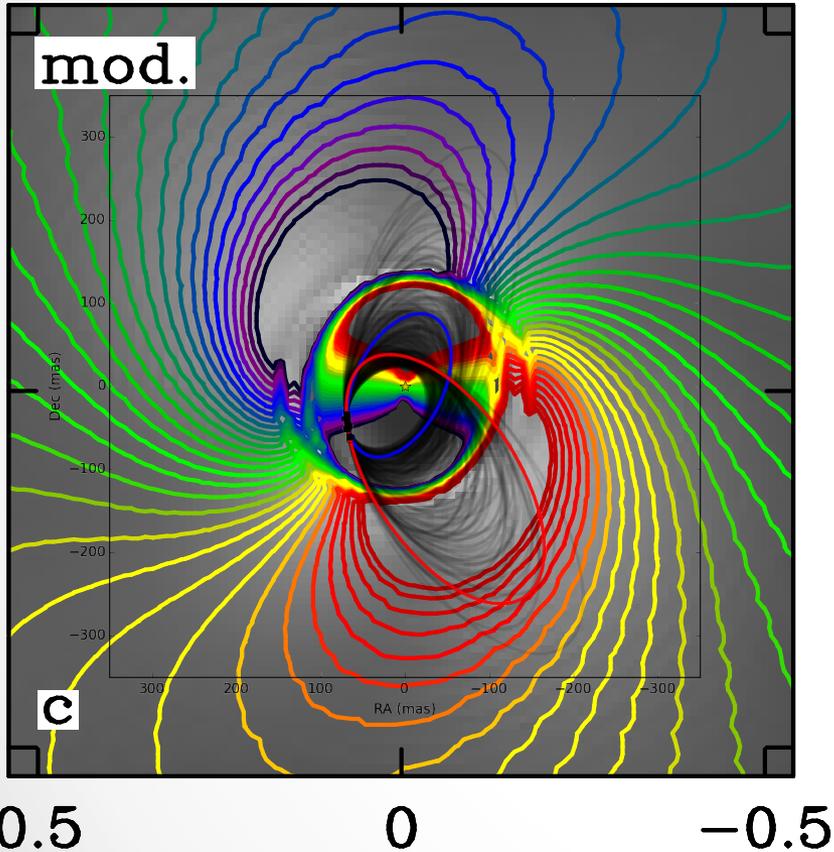


HD142527, ALMA data, 2012



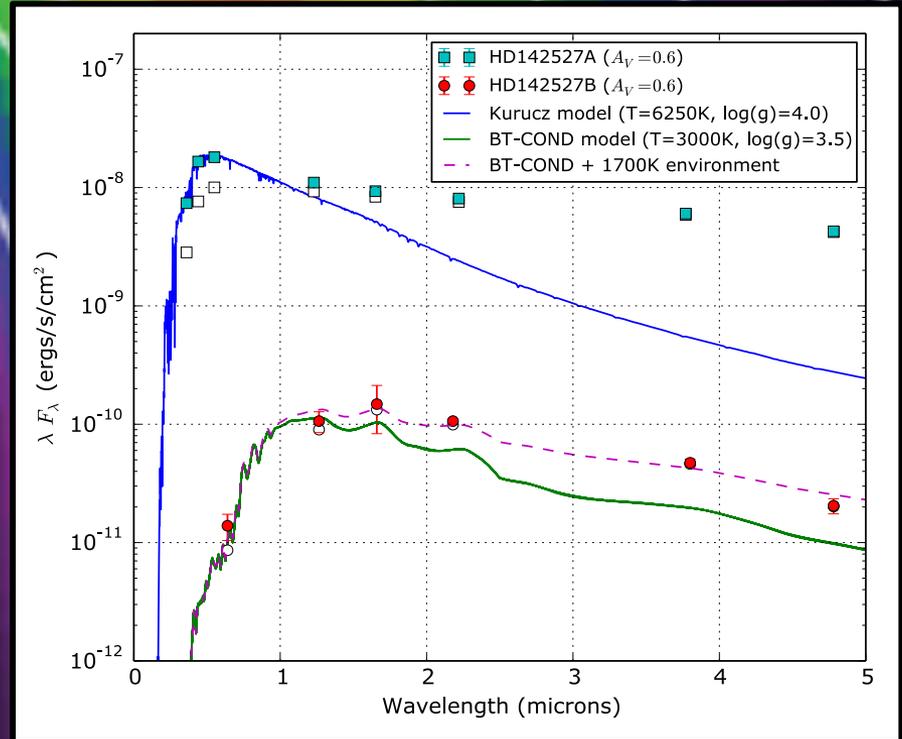
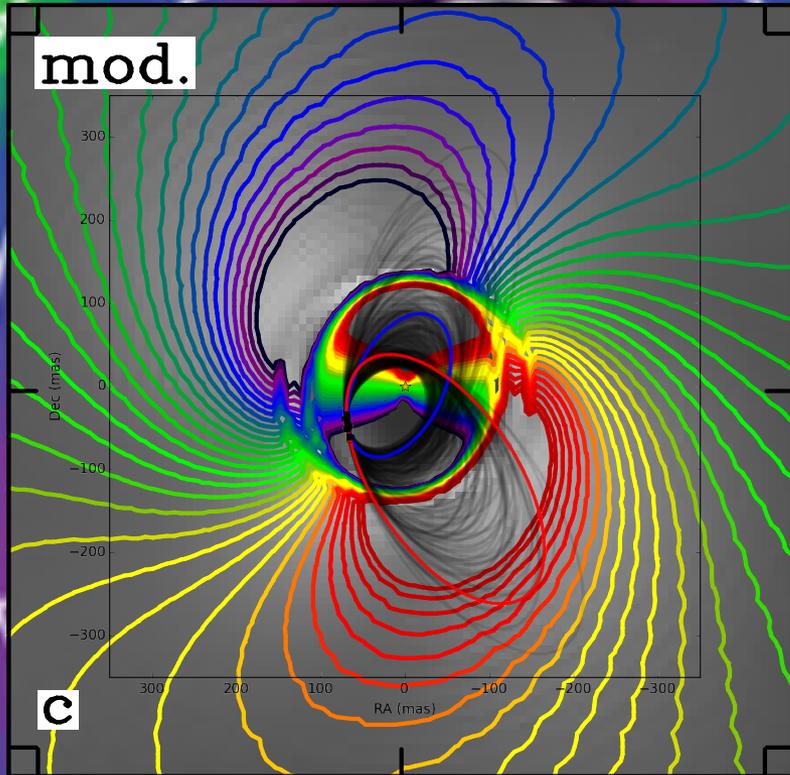
HD142527B, SAM Data (NACO+GPI)

HD142527



Inclination of inner disk 47° and PA of -8°
(Casassus et al. 2015)

HD142527



Age: 2-5Myr
Temp: 3000K
Radius: 1.2 R_{sun}
Accretion: 1.7Msun/yr

in agreement with a $M=0.13$ Msun
from evolutionary models (Baraffe et
al. 1998)

Conclusion

- Aperture Masking is remarkable to probe the 1-10AU zone for planet formation
- It will give you the little “+” in terms of dynamic range at small IWA compared to full pupil AO
- The motions observed by aperture masking is complementary to the dynamic observed by ALMA at longer wavelength
- It is available on NACO, GPI
- It is under commissioning for VISIR, SPHERE
- It will be available on the E-ELT, JWST