

# Observations of $\beta$ Pictoris b

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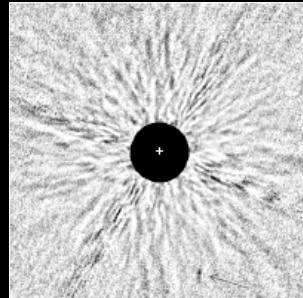
<sup>4</sup>*ESO, Karl Schwarzschild St, 2, D-85748 Garching bei Muenchen*

Lyot Conference – October, 25, 2010

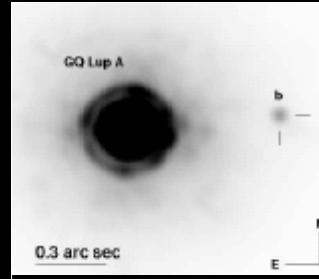


Mjup

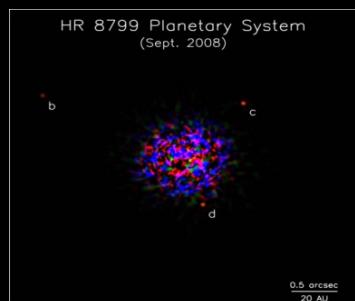
Tahlmann et al.  
(2009)



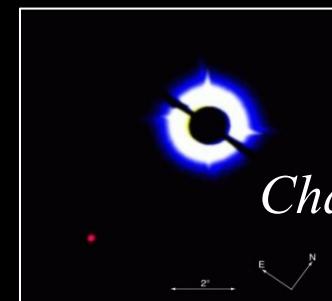
Neuhäuser et al.  
(2005; 2008)



13



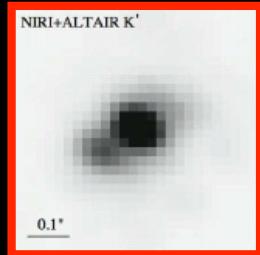
Chauvin et al. (2005a)



5



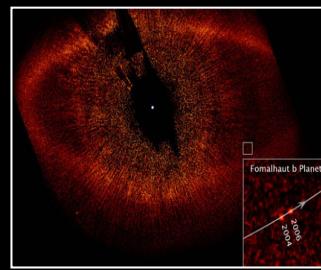
Marois et al. (2008)



Bedard et al. (2010)

20-60 AU

Lafrenière et al. (2008; 2010)



Chauvin et al. (2004; 2005)

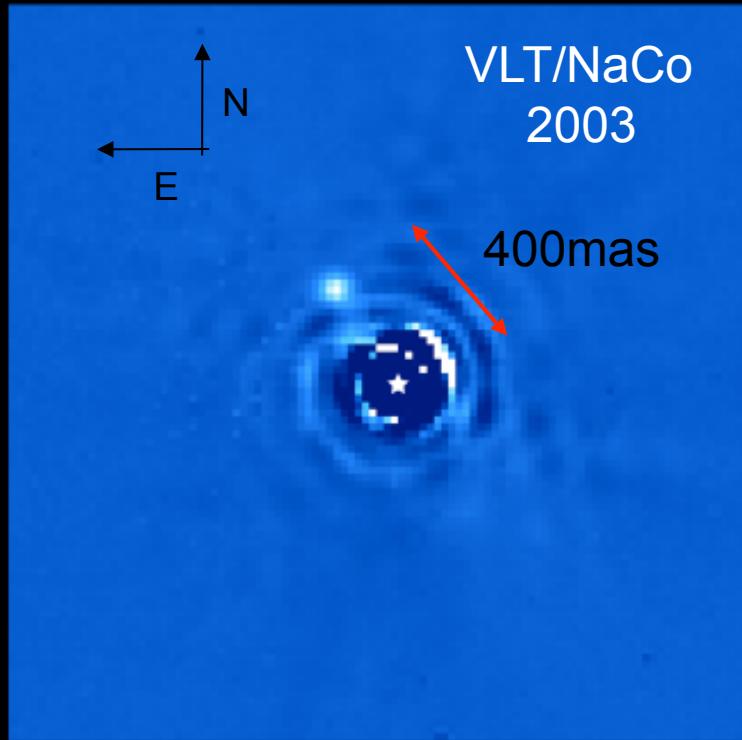
1

10-20 AU

Kalas et al. (2008)

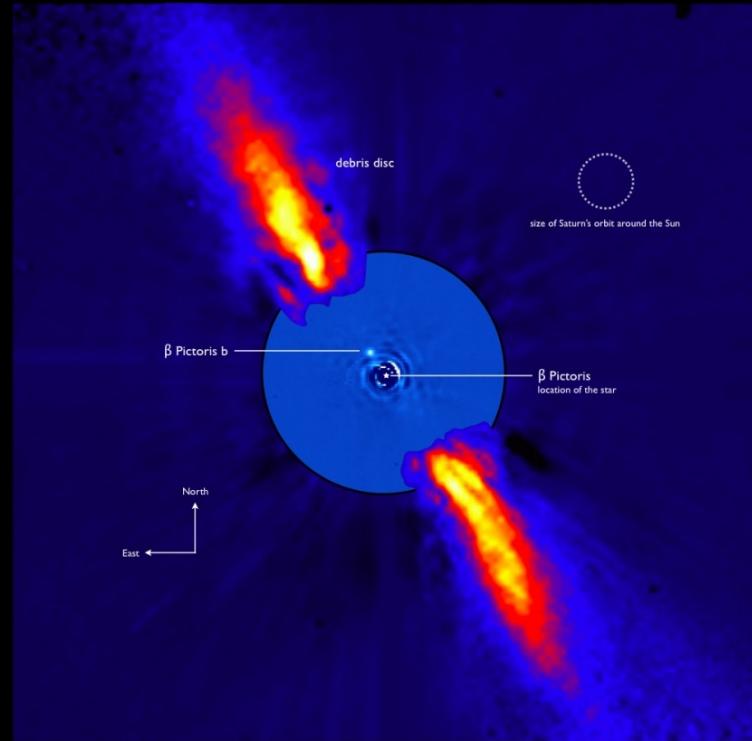
100-350 AU

# Planet candidate around $\beta$ Pictoris



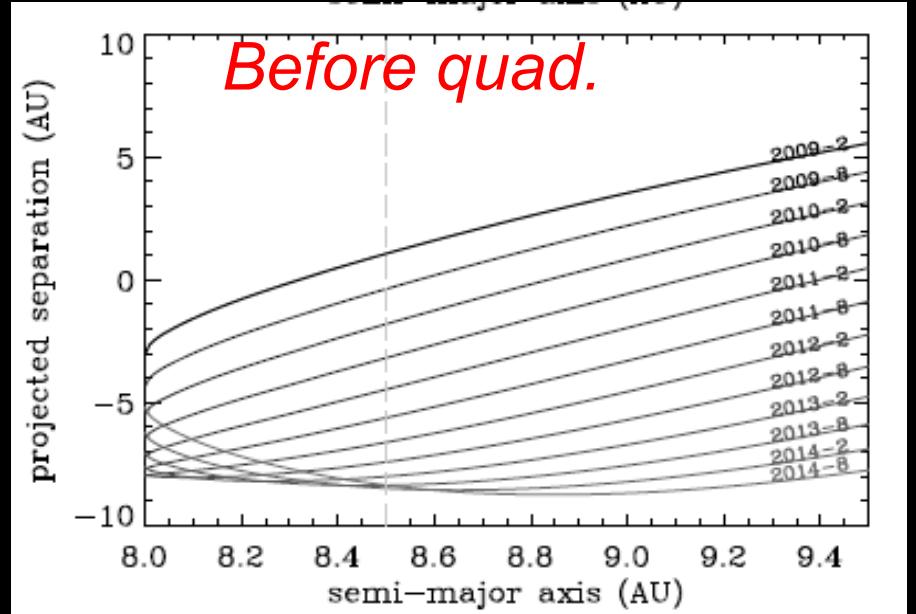
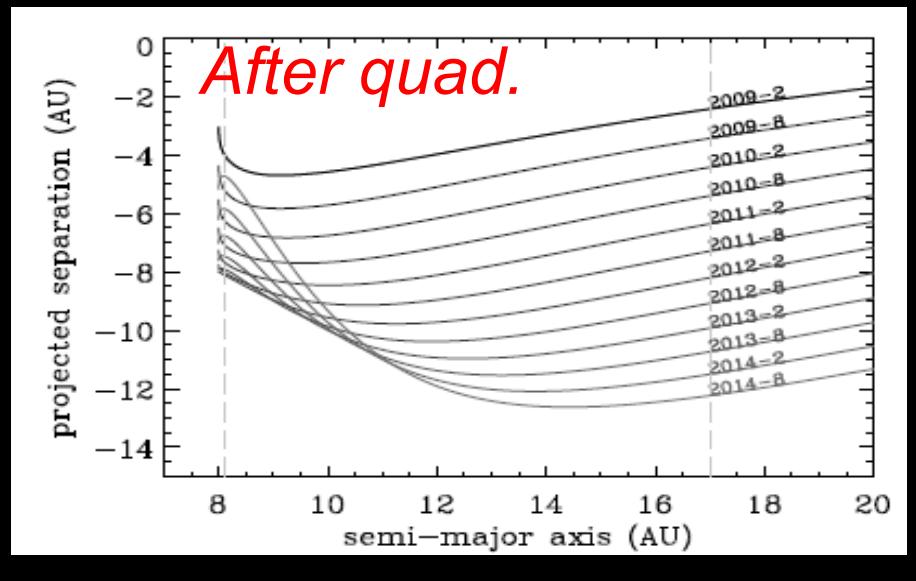
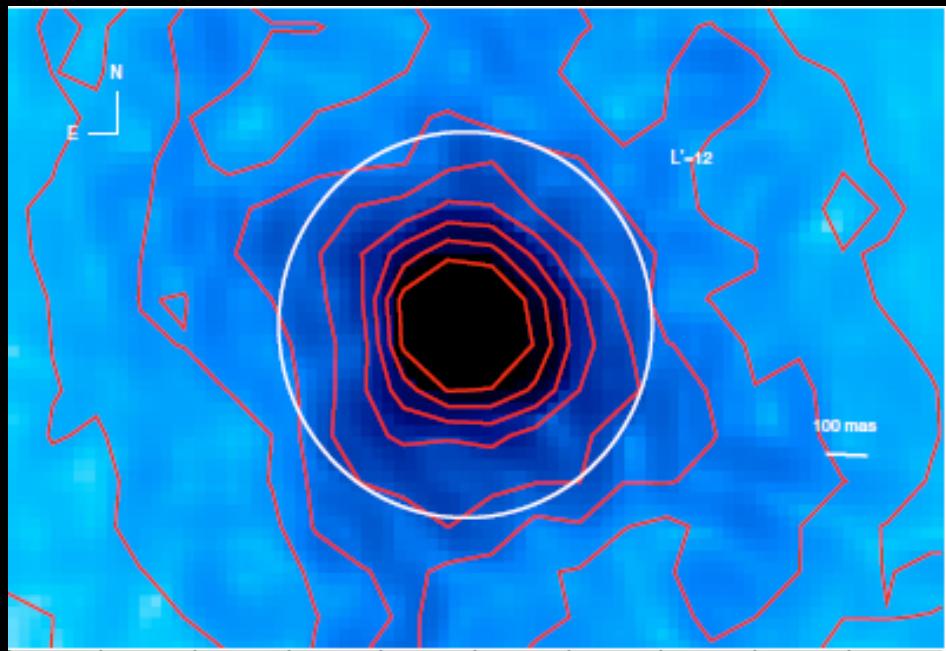
*Planet candidate*

- .  $\Delta L' = 7.7 \pm 0.3 \Rightarrow M \sim 9M_{Jup}$  if bound (“hot start”)
- . Sep =  $411 \pm 8$  mas ( $\sim 8$  AU) proj.      P.A. =  $31.8 \pm 1.3^\circ$  (disk P.A.  $\sim 33^\circ$ )
- . Teff  $\sim 1500$ K
- (Age  $\sim 12$  Myr)



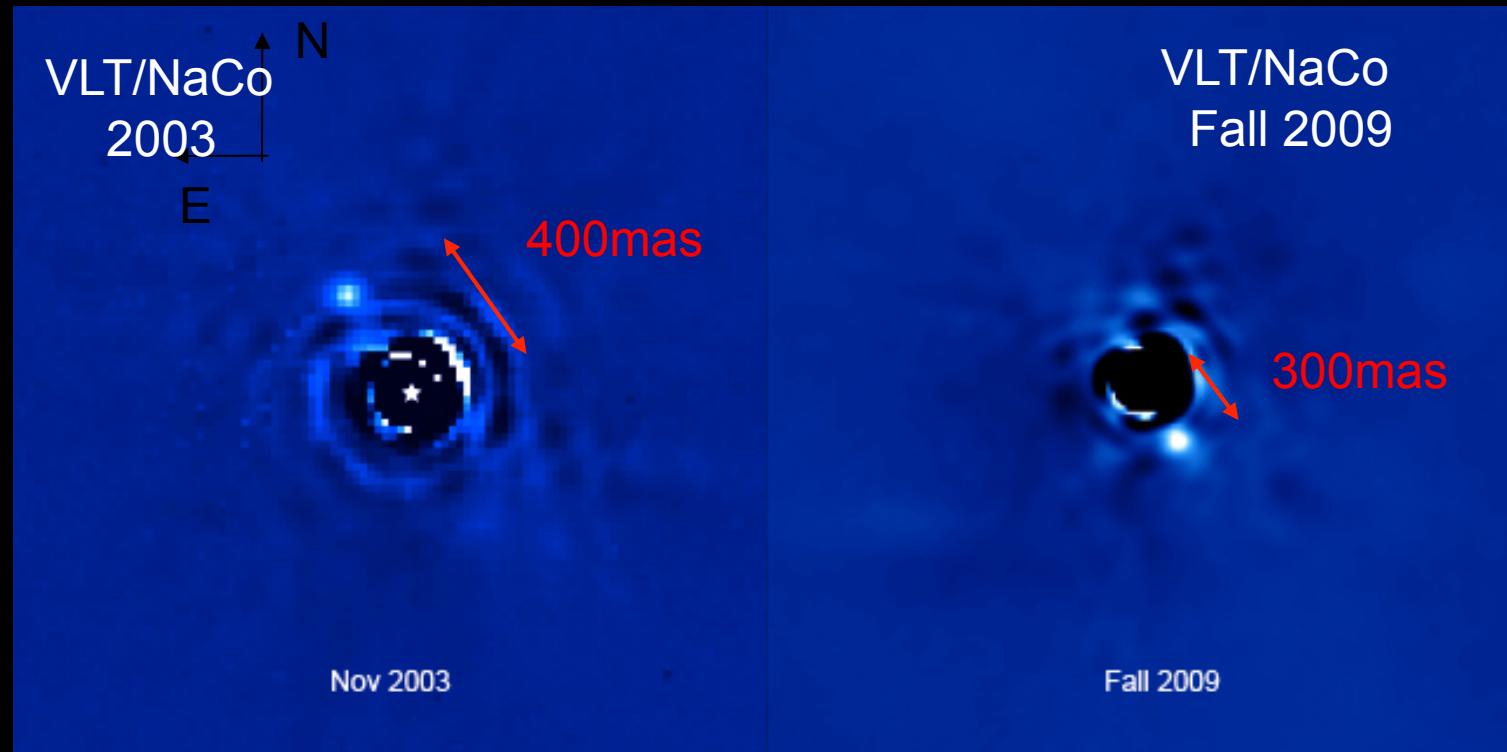
*Lagrange et al (2009a, 2009b)*

# February 2009

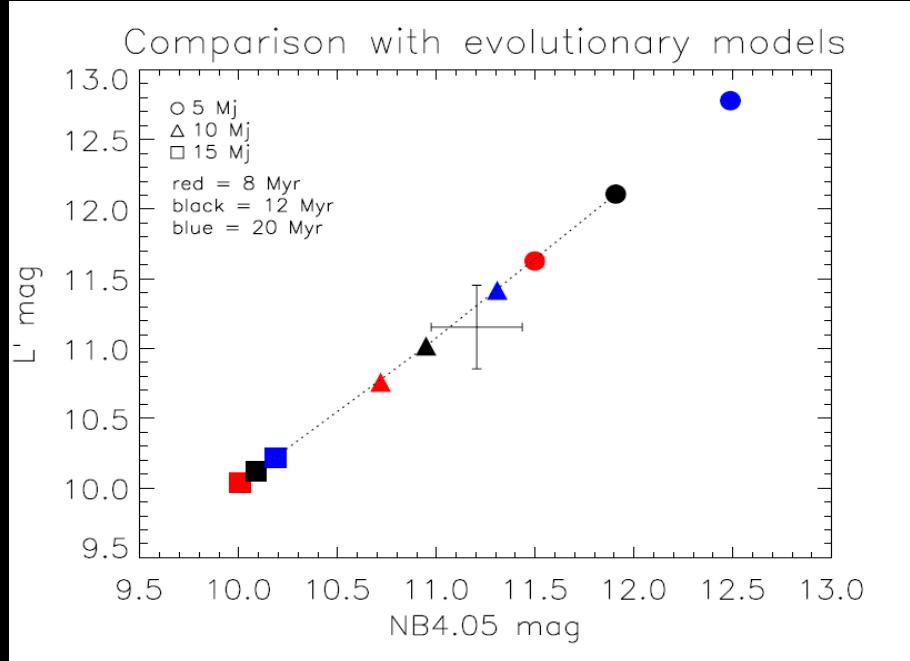
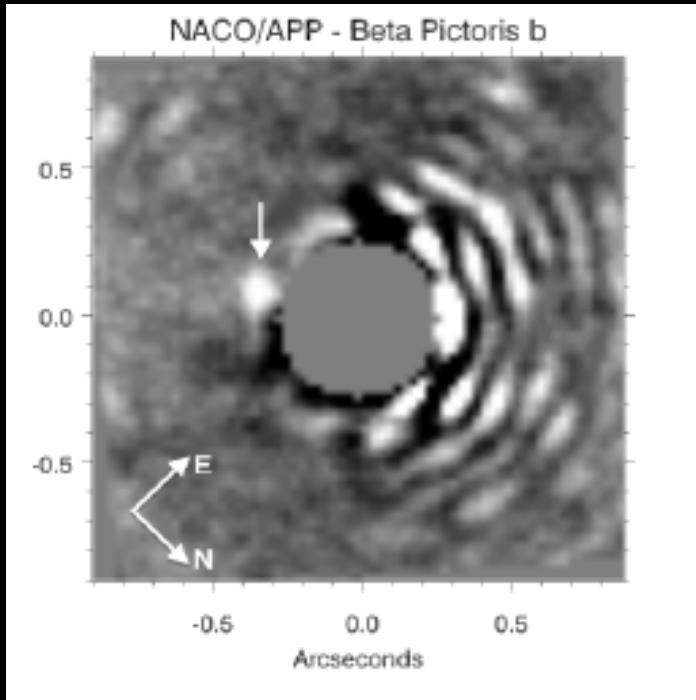


*Lagrange et al (2009); see also Fitzgerald and Kalas (2009)*

# Planet around $\beta$ Pictoris

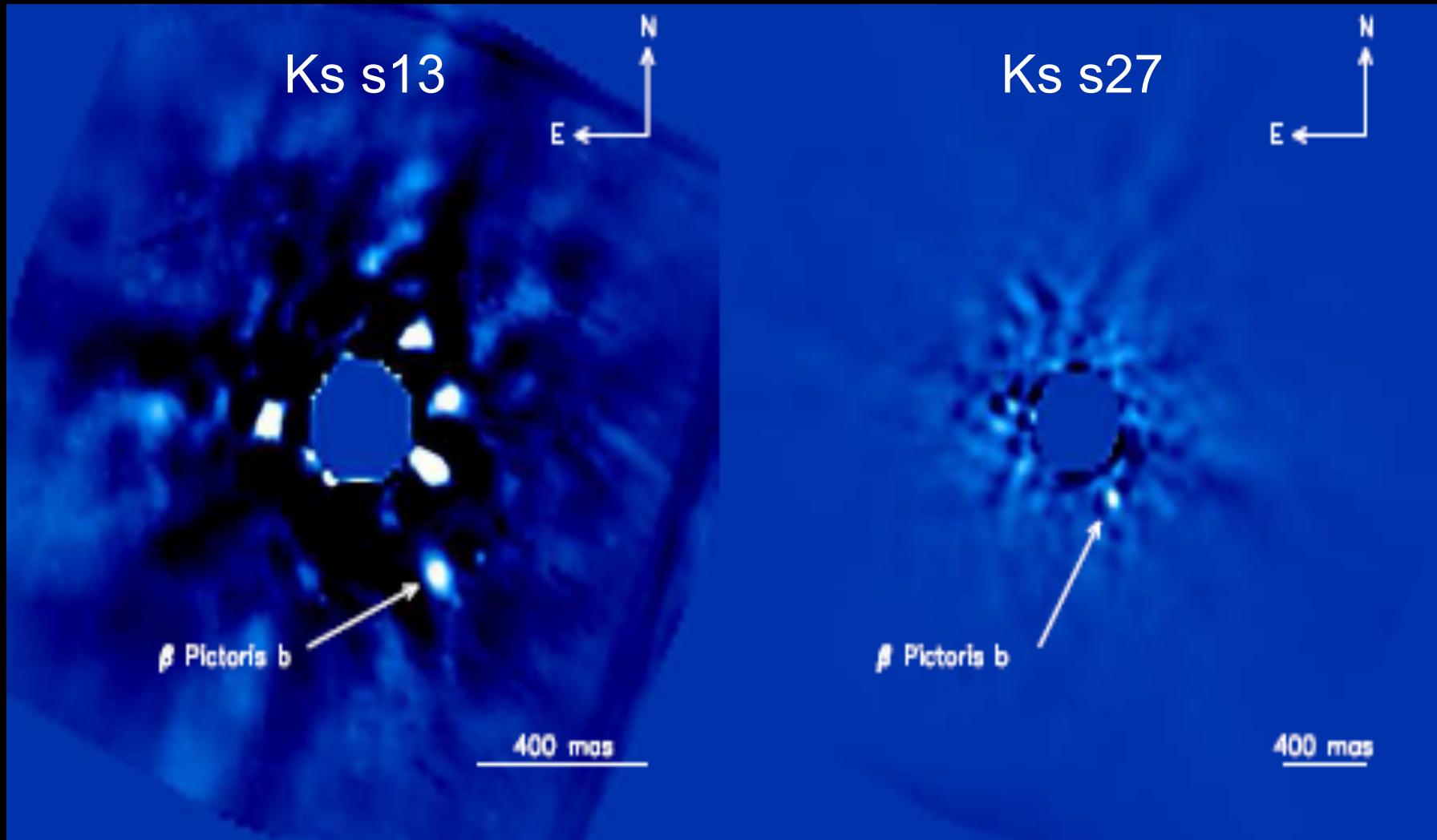


*Lagrange et al (2010)*



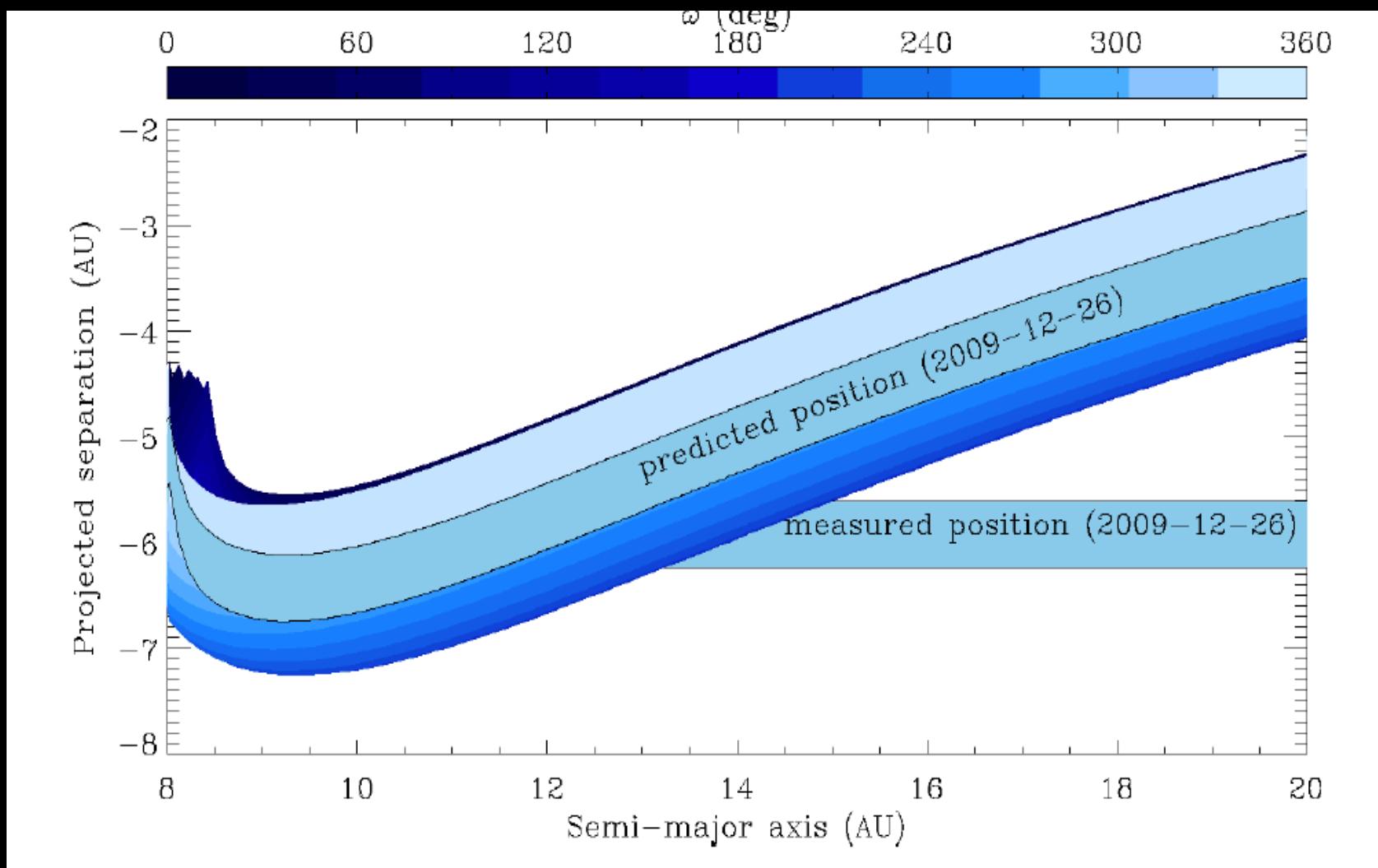
NB4.05 mic

*Quanz et al (2010)*



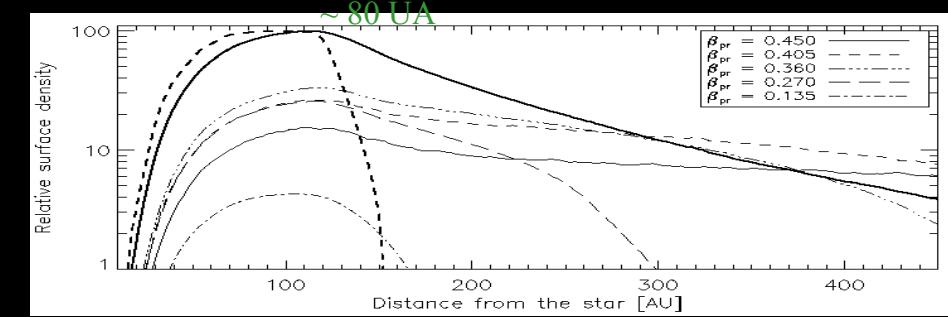
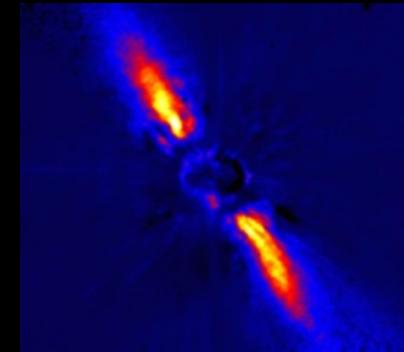
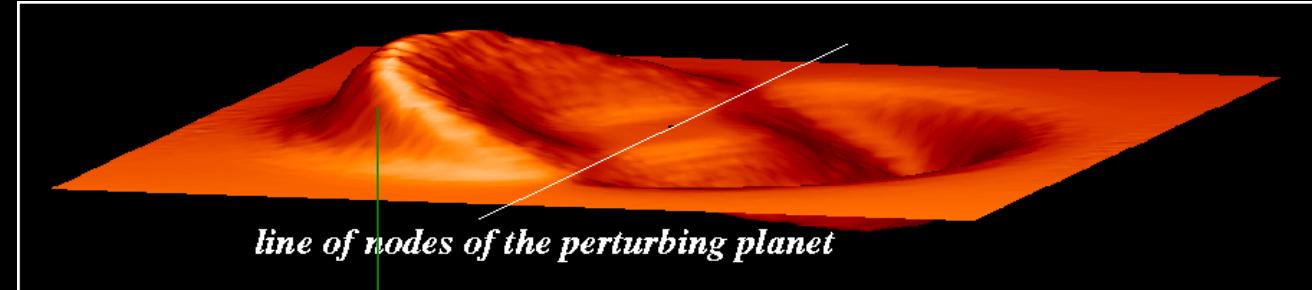
Teff = 1600 +/- 200K

*Bonnefoy et al (2010)*

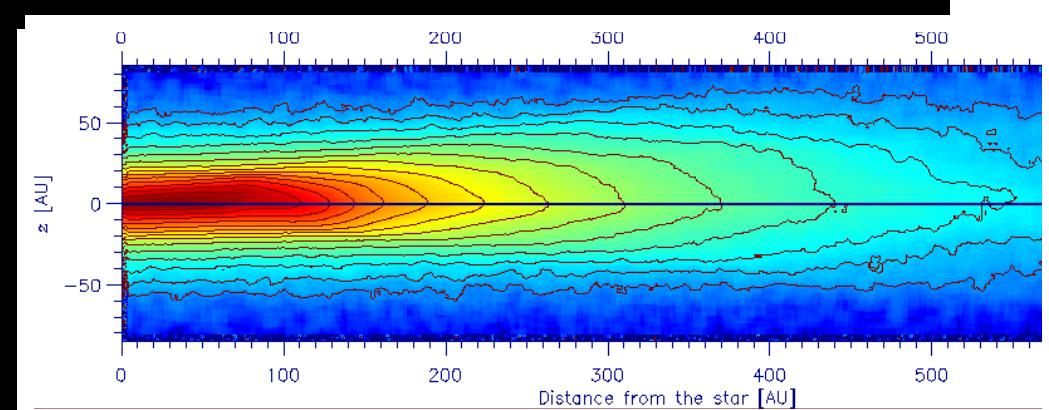
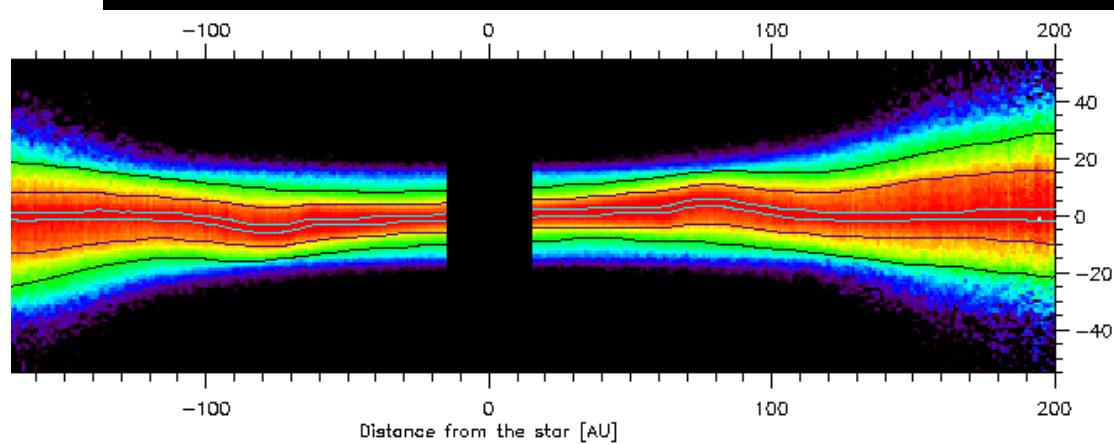


Semi-major axis: ~8-14 AU

# Planet on an inclined orbit, 10 AU

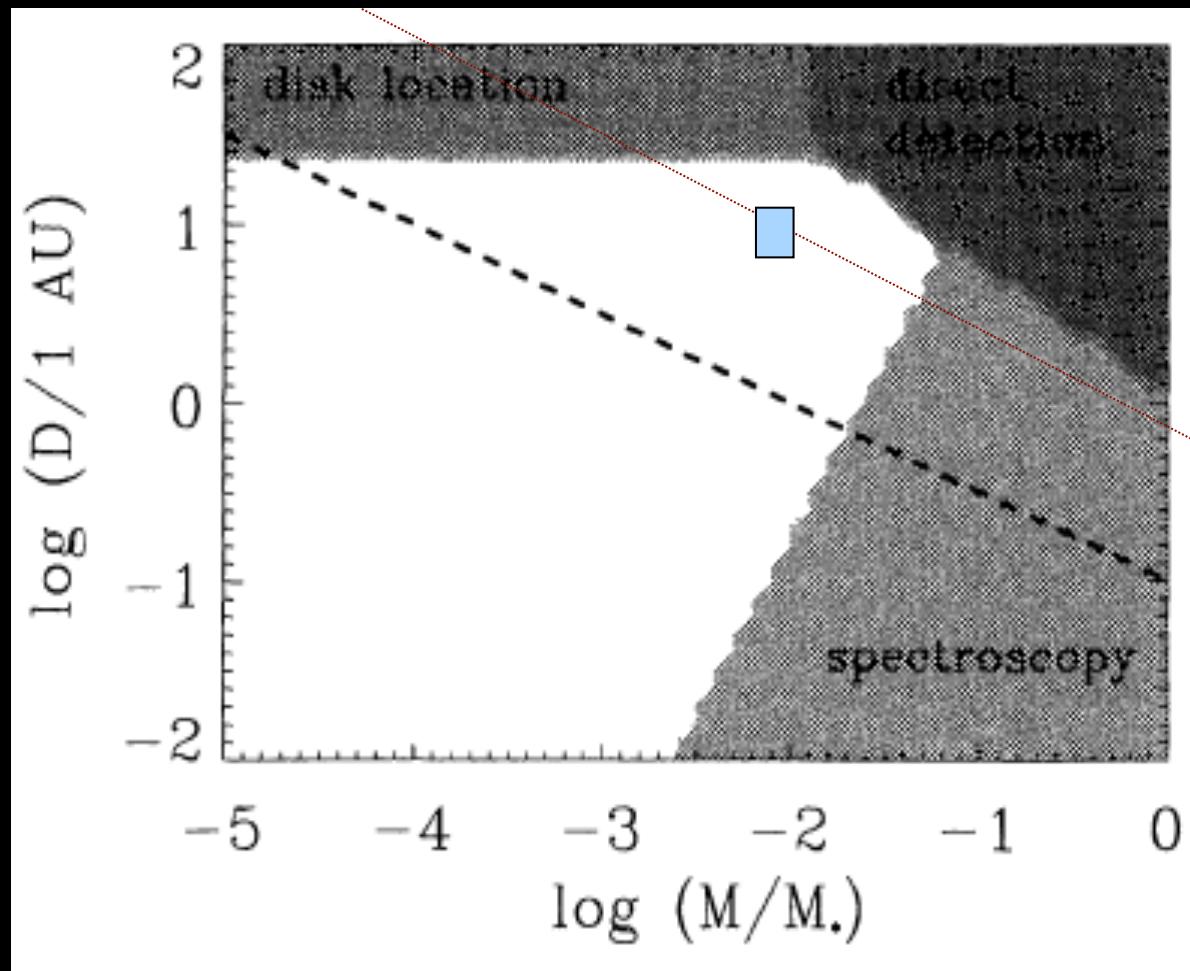


*Mouillet et al. (1997)*

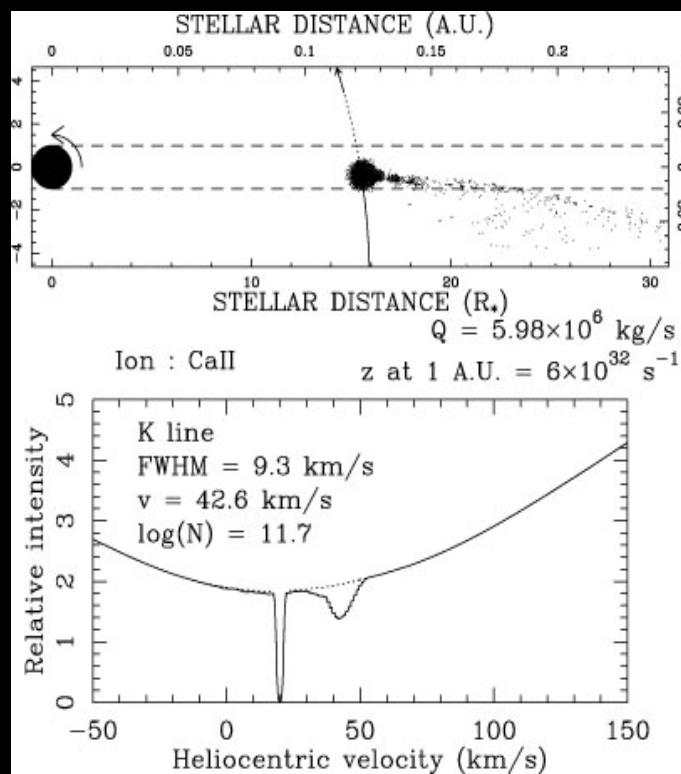
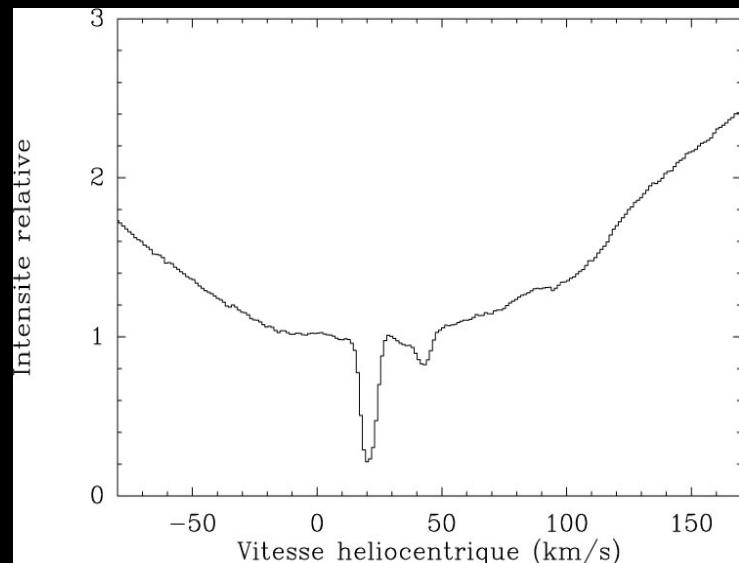


*Augereau et al. (2001b)*

# Constraints from the warp modeling

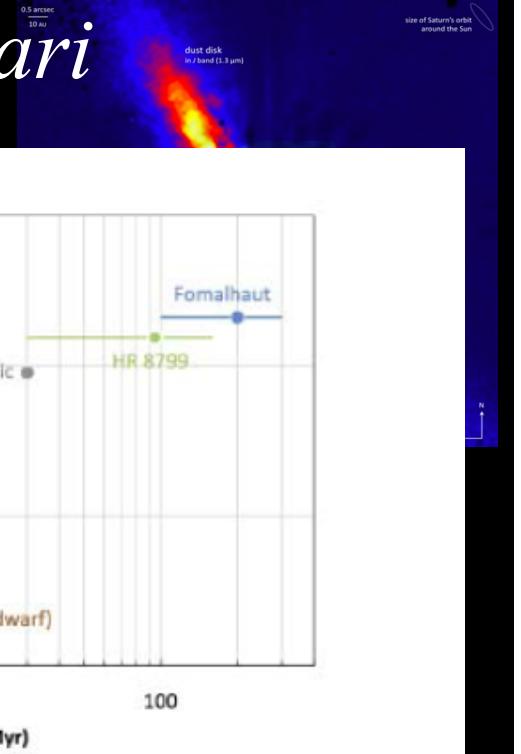


## 90's: Falling Evaporating Bodies on $\beta$ Pictoris => indirect evidence for planet ?



Vidal-Madjar, Lagrange, Beust, Morbidelli...

# Implications on planet formation scenario



- Formation timescale:  
formed rapidly (< a few Myr; see also 1RXS1609)
- Formation process:  
could be core accretion (see Kennedy & Kenyon 08)
- (Unique) test of mass-brightness relations:  
independant constraints on the mass available/accessible
- (Unique) test of a large period planet interior ? (Lecavelier et al)