

# **The Mysterious HD 50138**

**Anahi Granada**

**Barbara Rojas**

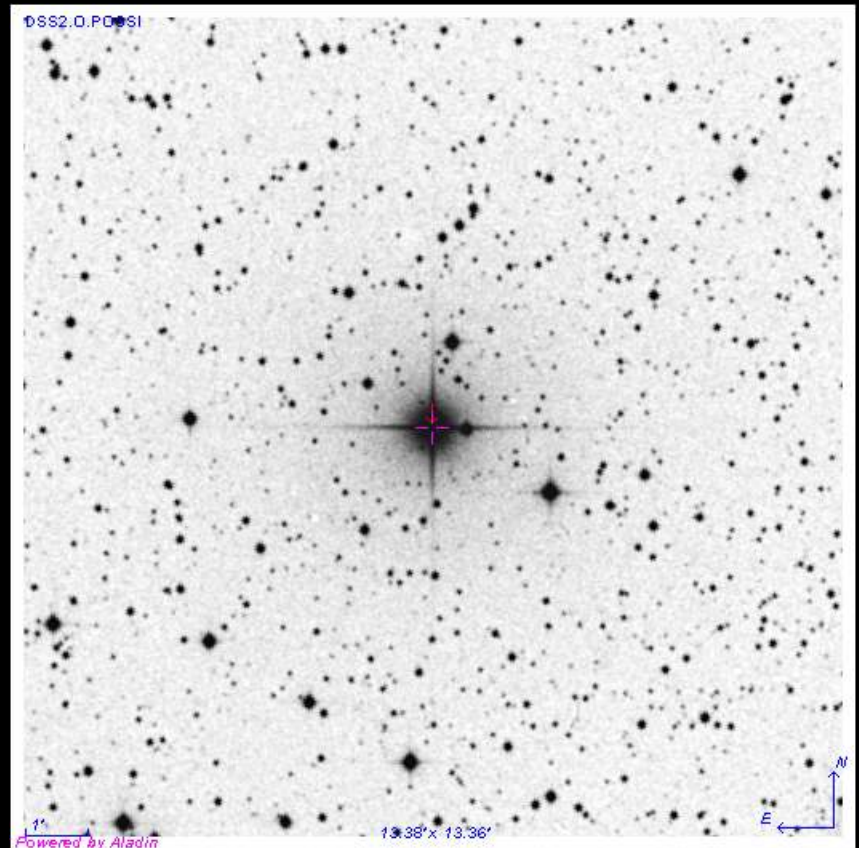
**VLTI School 2007**

# Overview

- Why ?
- How?
- Data analysis
- Conclusion

# Why should we care?

- HD 50138 (MWC 158)
- First detection Merrill & Humanson (1921)
- Balmer line emission + other atomic ions lines
- Polarization
- IR excess



# Why should we care?

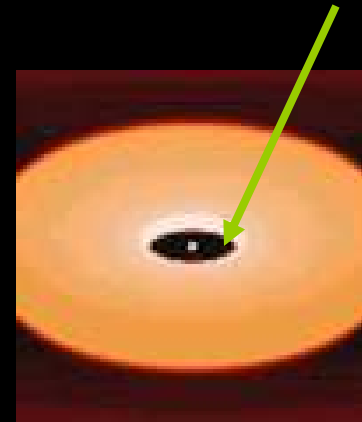
- Ambiguous classification
  - Maybe Herbig Ae/Be? (Morrison & Beaver 1995)
  - Maybe B[e]? (Boop 1993)
  - Binary? (Cidale et al. 2001)

Star	$M \pm \sigma_M$	$T_{\text{eff}} \pm \sigma_T$	$R \pm \sigma_R$
HD 50138	$M_{\odot}$	K	$R_{\odot}$
Primary	$4.2 \pm 1.3$	$15\,160 \pm 2670$	$2.6 \pm 0.7$
Secondary	$1.5 \pm 0.9$	$7280 \pm 2200$	$1.1 \pm 0.5$

So... where is the secondary???

# Why should we care?

- Wide system?
  - Baines et al. (2005)
- Close system?
  - Private communication  
A. Carmona (06/06/07)



RADICAL

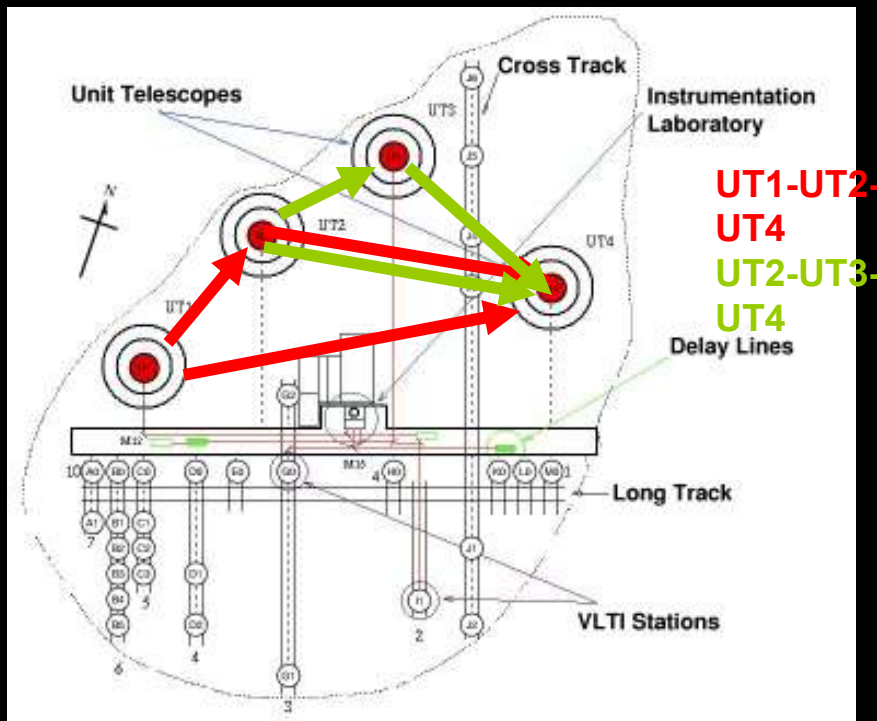
“No CO 4.7 $\mu$ m emission => no gas in inner regions”



Cleared by a companion????

# VLT

- AMBER



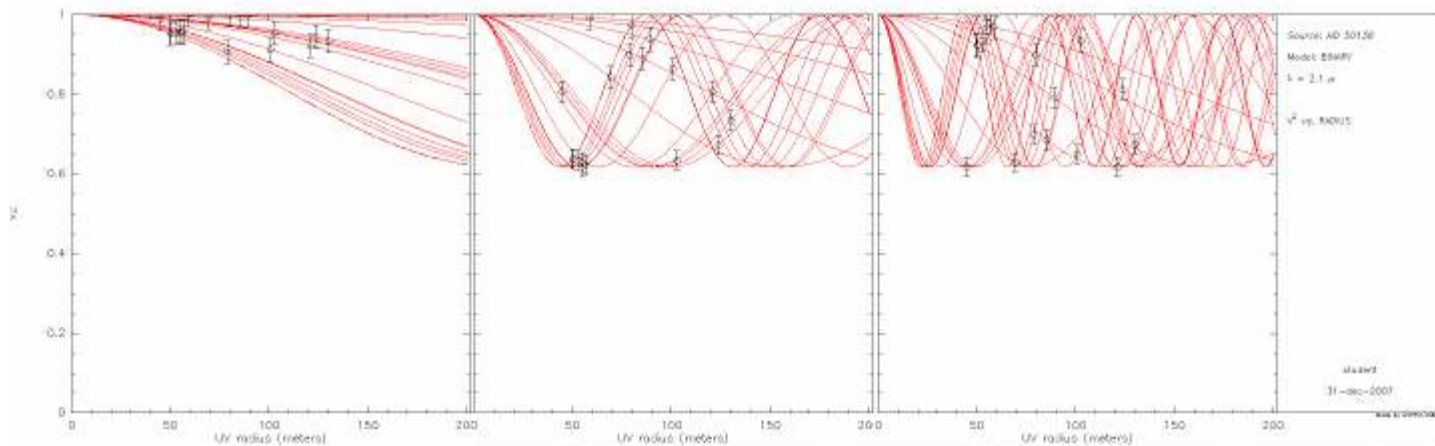
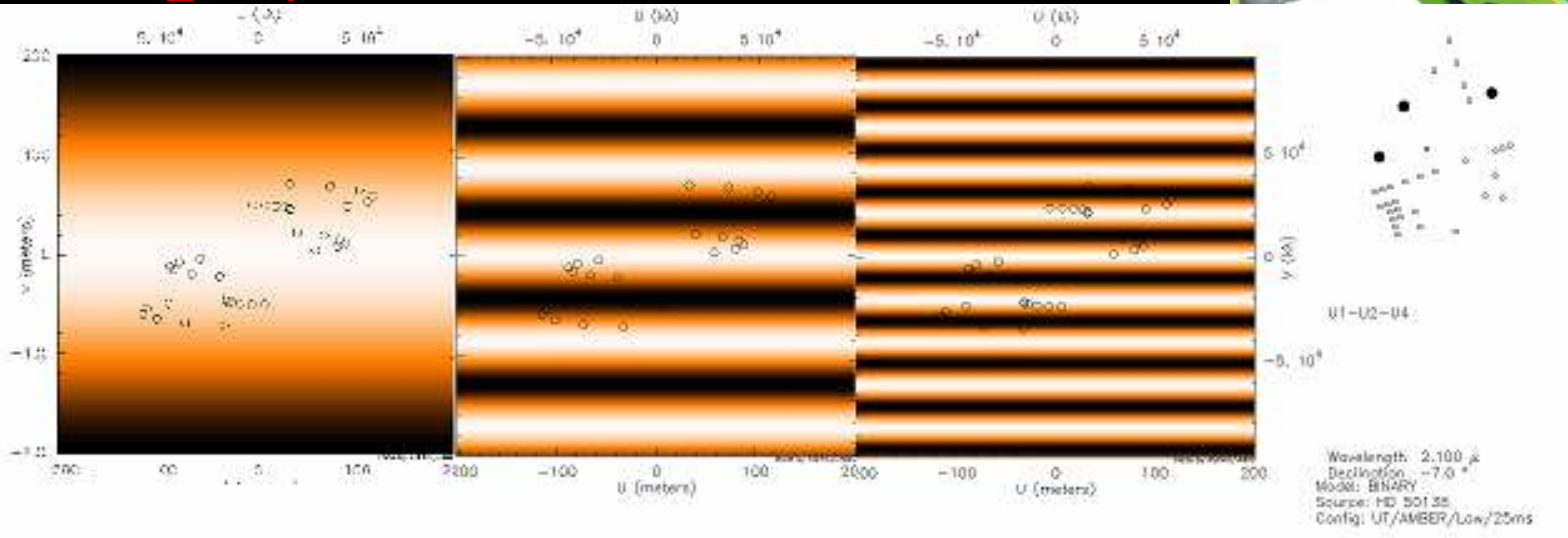
HD 50138  
RA=6:51:33.40  
DEC=-6:57:59.44  
K(mag)= 4.15 H(mag)= 5.9

- Triplet of telescopes => 3 visibility points in the (u,v) plane
- Earth's rotation to increase the (u,v) coverage
- DEC2007/JAN2008
- 7 hrs (30 min OSP for calibration and target) =>21 visibility points
- Calibration Star HD52938\_M04, ~6°
- Low resolution (DIT 25ms)

# Toy Model

- Binary model (Cidale et al. 2001)

$$F_2/F_1 = 0.12, \square = 1-10 \text{ mas}$$



**U1-U2 = 56.56 m**  
**U1-U4 = 130.23 m**  
**U2-U4 = 89.44 m**  
**U2-U3 = 46.63 m**  
**U3-U4 = 62.46 m**

# Final Remarks

- Use of available software (Gasgano, etc)
- If there is no binary fit...
  - Inner rim disk? -> toy model

We tried to go through all the steps of the proposal but...

- Stellar parameters are not well defined ...
- still some doubts about how AMBER works and requirements of the proposal (ATs vs UTs)
- some help would be required for a “complete” proposal