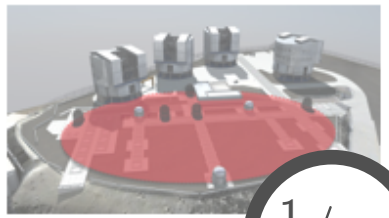
# A PIONIER Herbig AeBe Large program: *The missing MIDI link*

Jean-Philippe Berger

B. Lazareff, J. Kluska, J.-B. Le Bouquin, F. Malbet, M. Benisty, J. Monnier, F. Baron, E. Thiébaut, F. Soulez, C. Dominik, A. Isella, A. Juhasz, S. Kraus, R. Lachaume, F. Ménard, R. Millan-Gabet, C. Pinte, M. Tallon, W.-F. Thi, G. Zins.

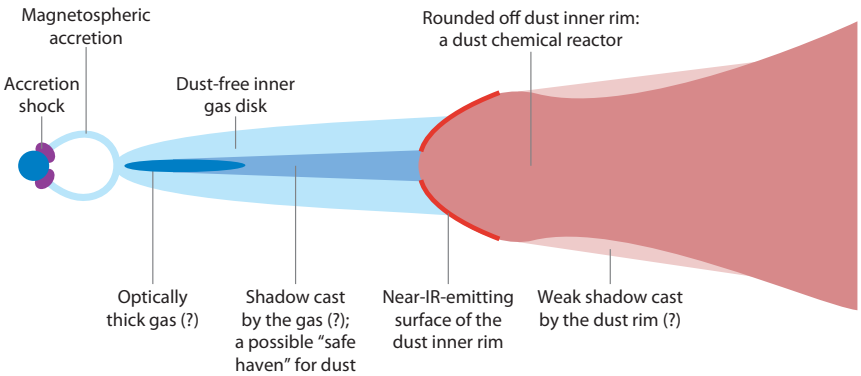
MIDI Conclusion Workshop
2014 May 5th



# A PIONIER large program

**Goals:**

- Constraining the shape of the inner disk;
  - Vertical structure;
  - Non-axisymmetry
- Constraining the nature of the emission (gas,dust)
- Determining the temperature;
- Relation with central star outer disk;
- Signposts of planet formation;




# A PIONIER large program

## Sample:

- The brightest Herbig AeBe star

  (Hillenbrand+ 92, Thé+ 94, Malfait+ 98)

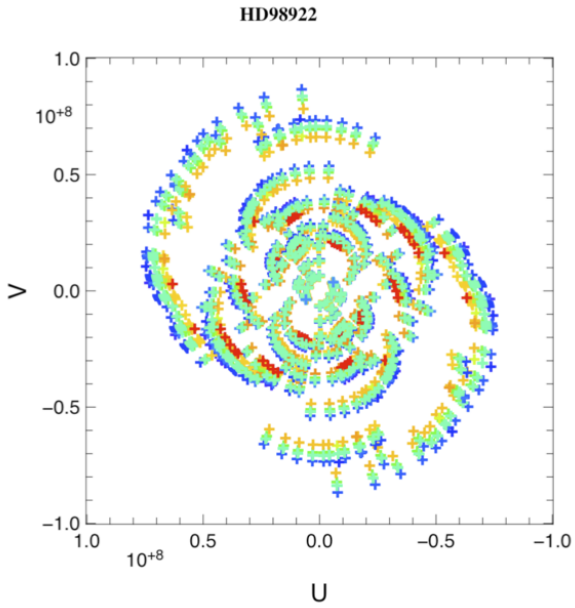
- 55 targets selected

- B0 to G stars

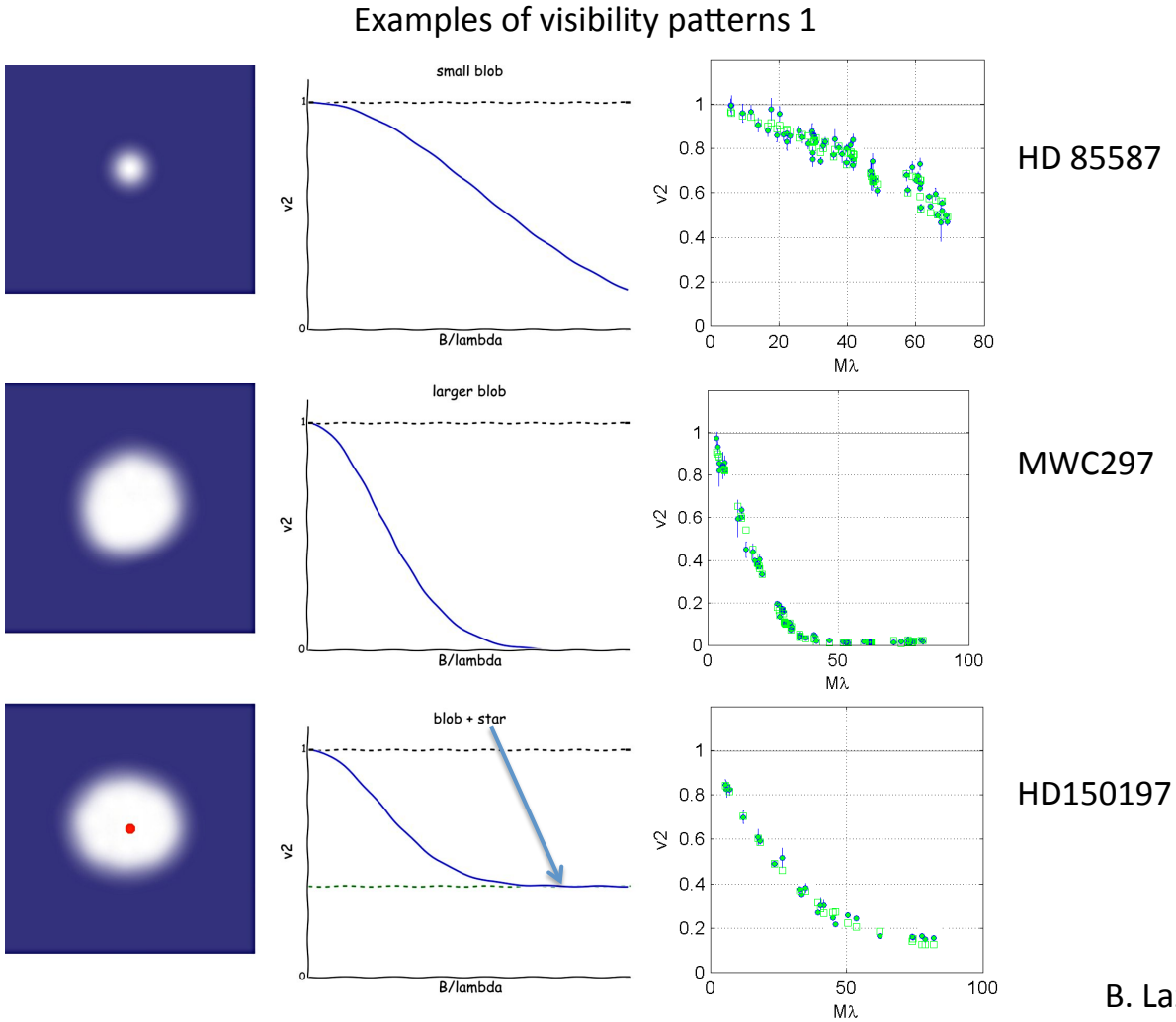
## Strategy:

- Snapshot survey: parametric modelling of emission morphology.

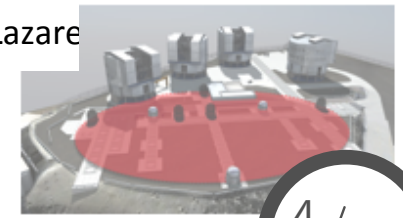
- Agressive uv coverage and image reconstruction on best resolved objects



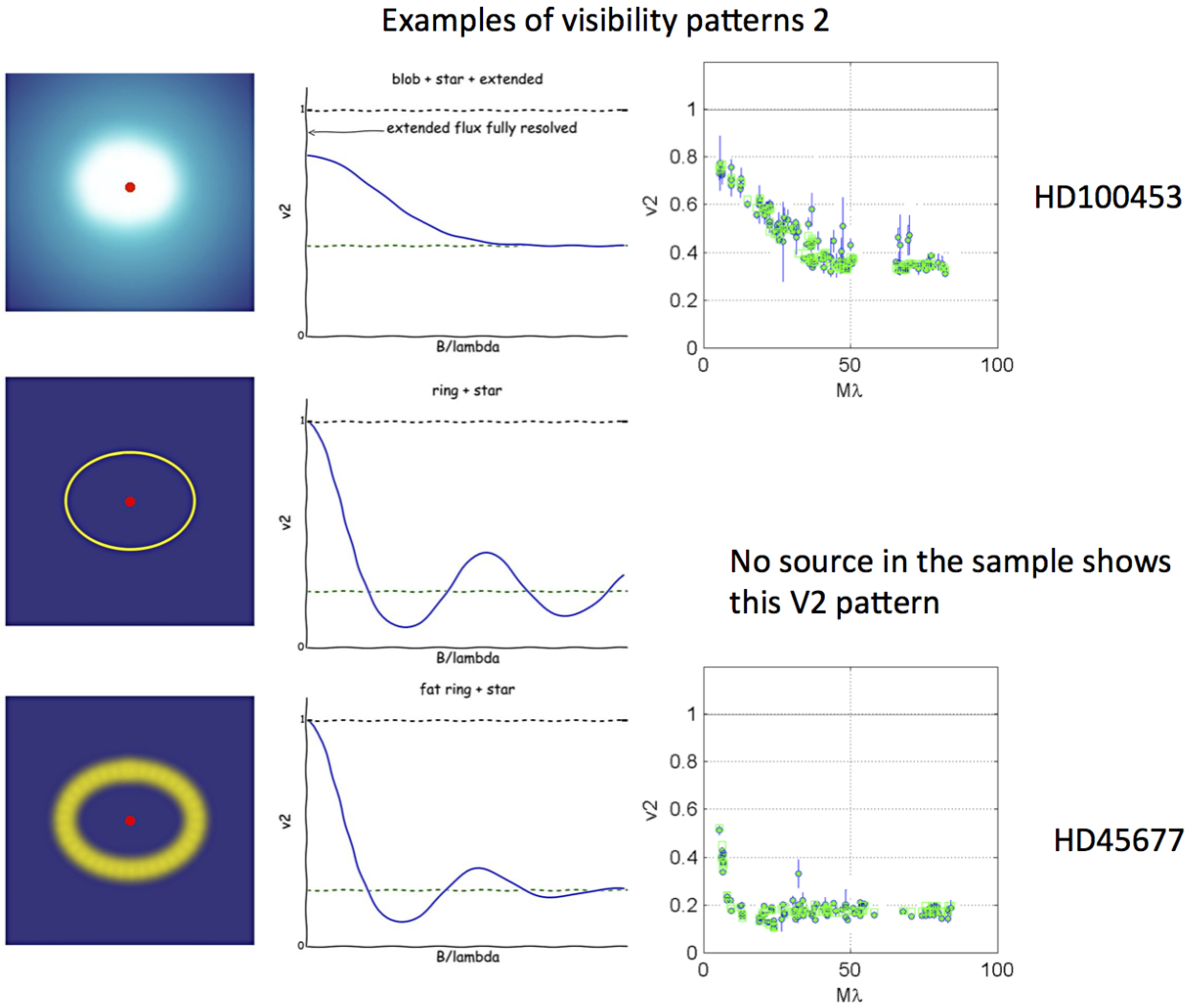

# Examples of visibility distributions (I)



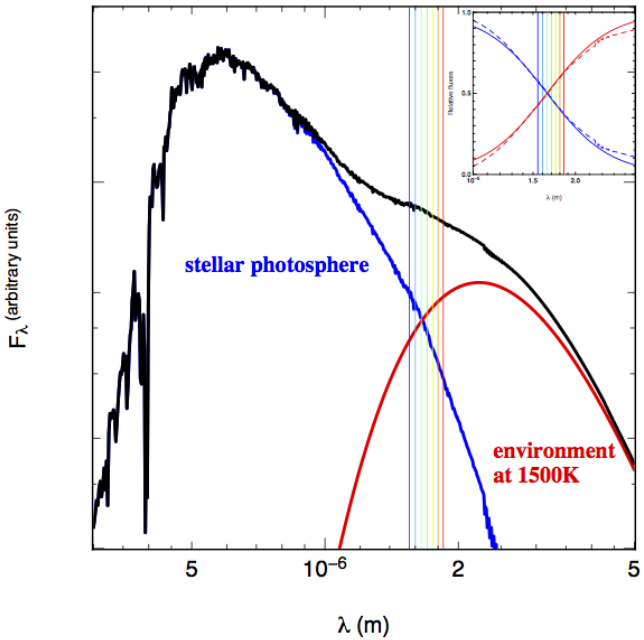

B. Lazare

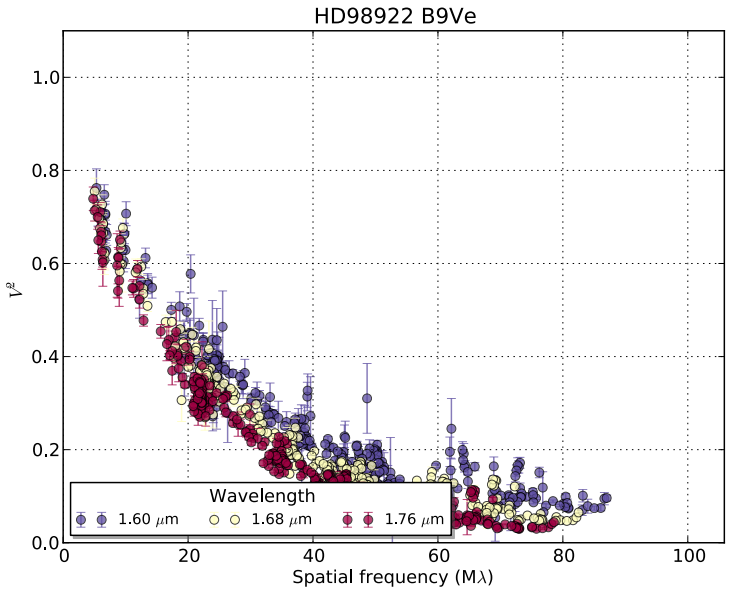


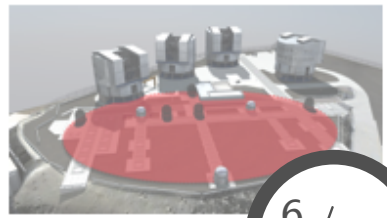
# Examples of visibility distributions (II)




# A strong chromatic flux ratio



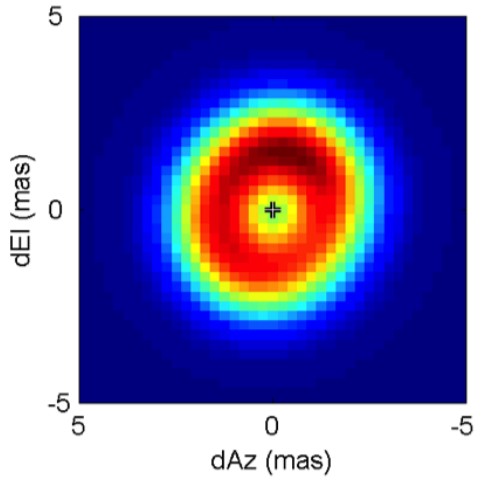



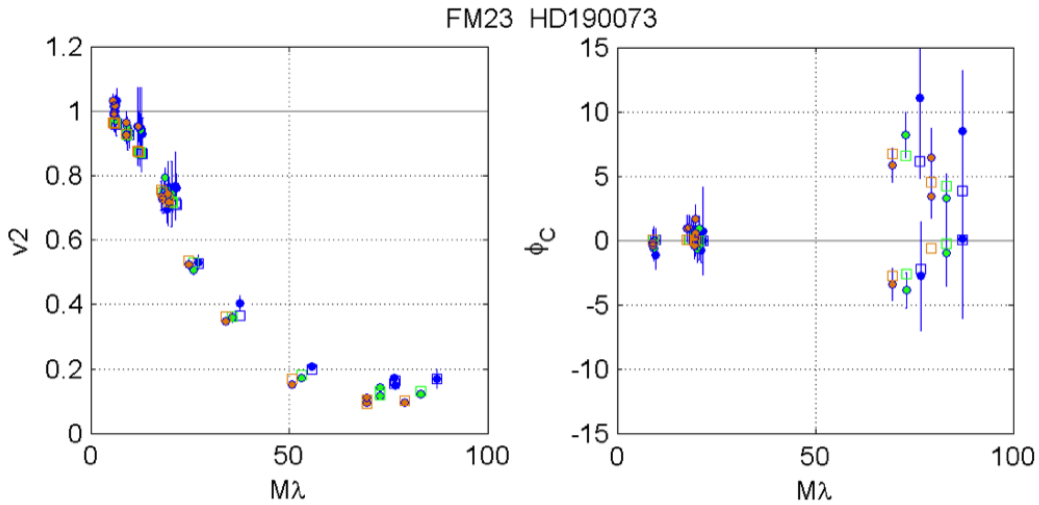
# Parametric modelling

## Visibility and Closure-Phases

**Aim**: Providing morphological parametrisation of the H band emission

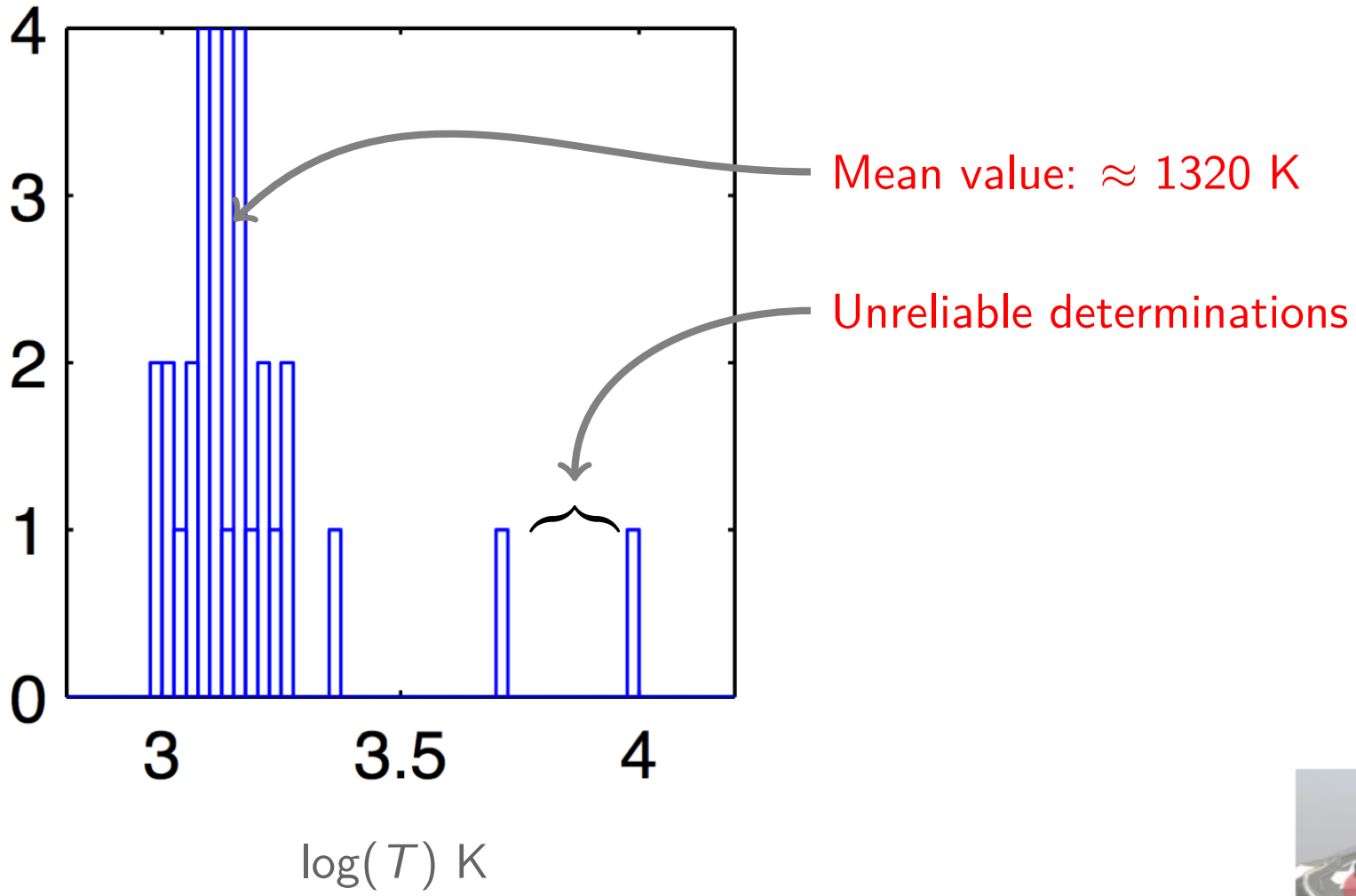
**Method:** Point source + Thin elliptical ring + Azimuthal modulation + Blurring + Halo (11 parameters)



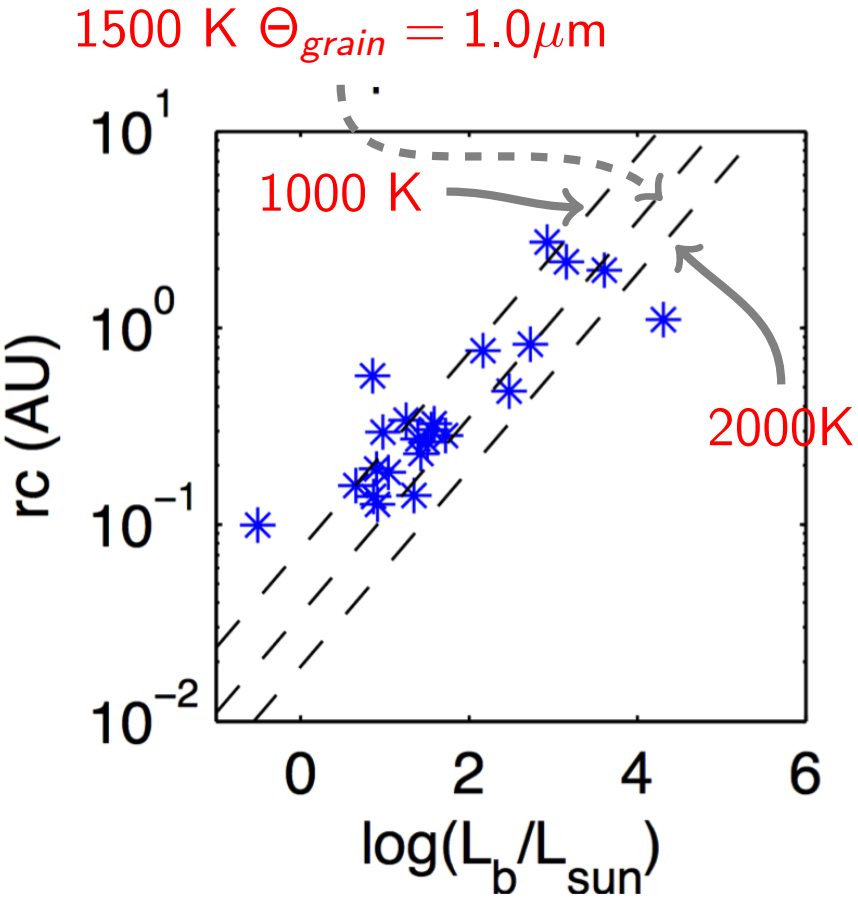

# Temperature distribution

On average consistent with silicate dust grain sublimation.



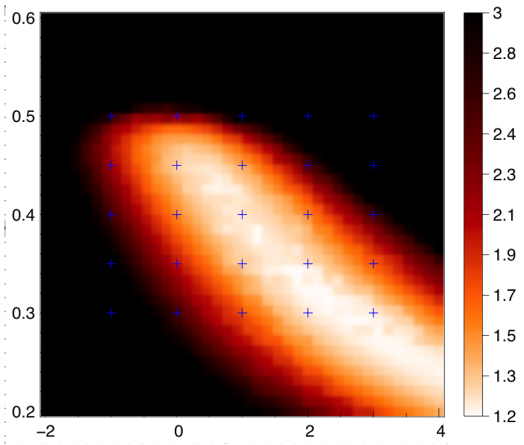

# Size - Luminosity relation

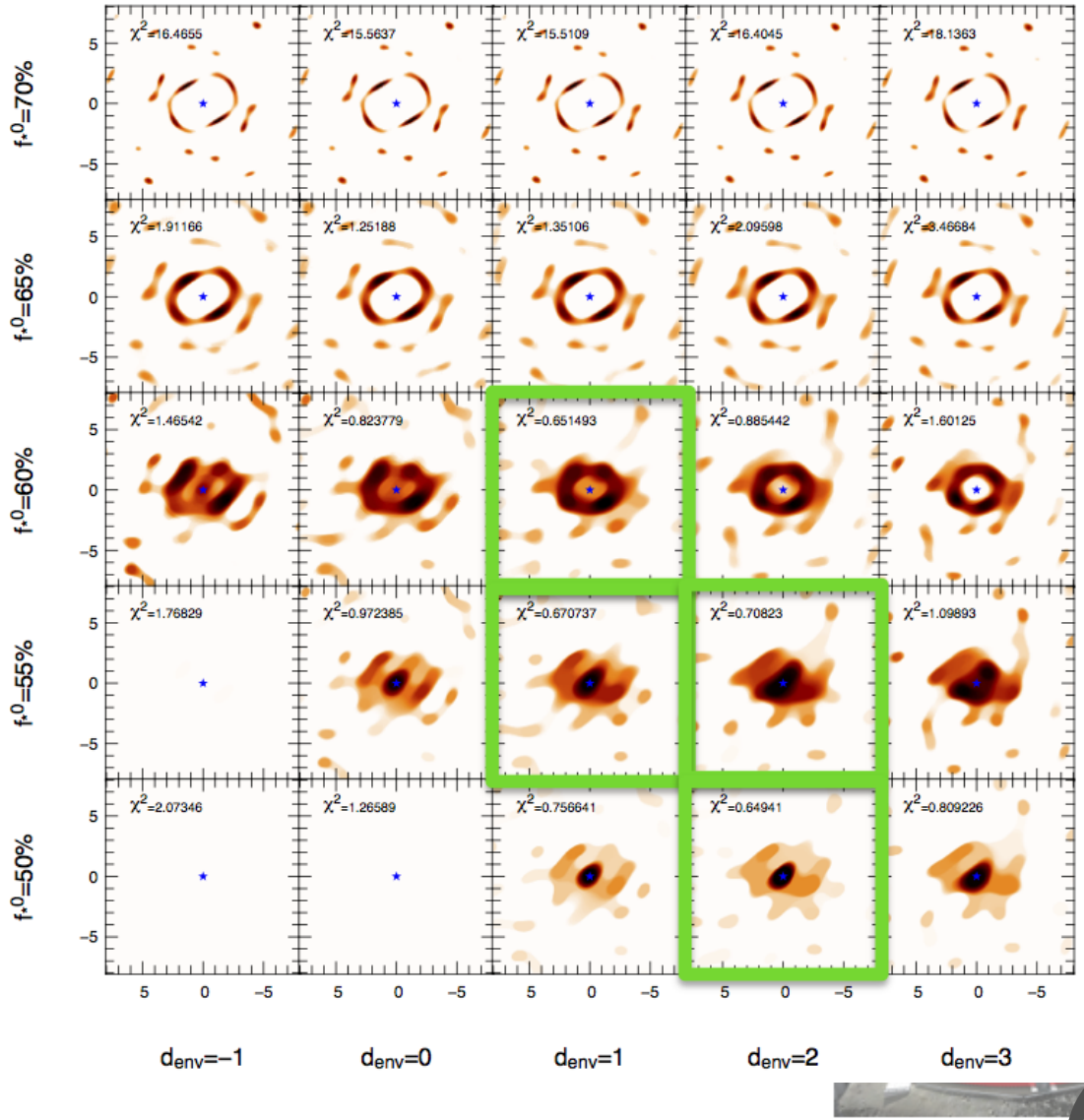
Confirmation of previous studies e.g. Monnier+ (2002,2005)



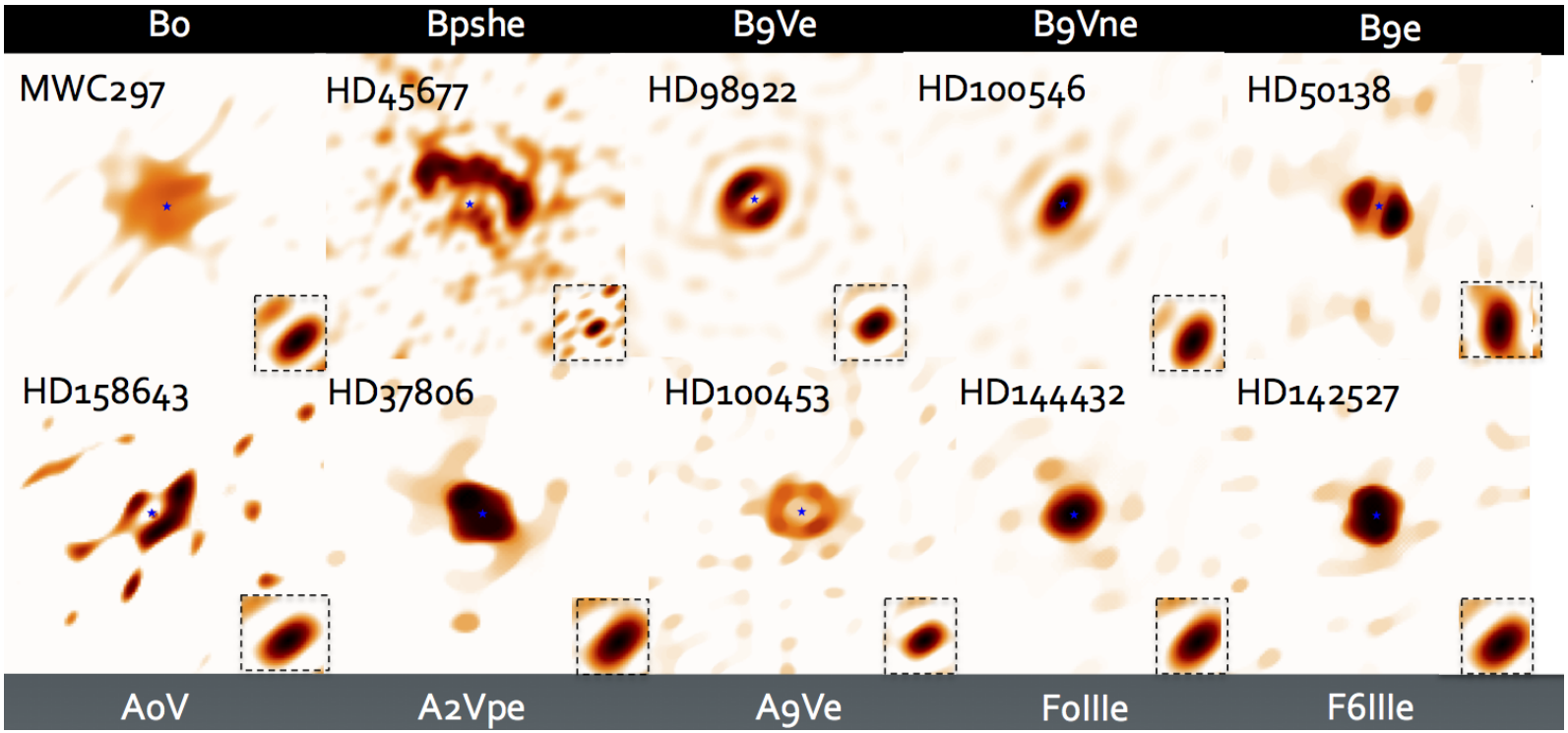

# SPARCO Image reconstruction

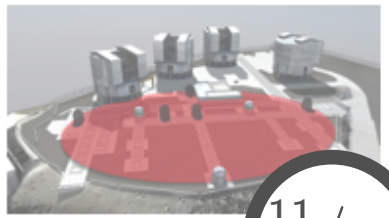
## The importance of knowing the photometry



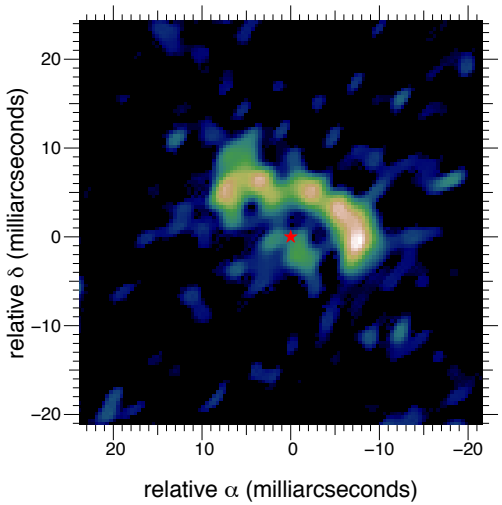
# Reconstructed images



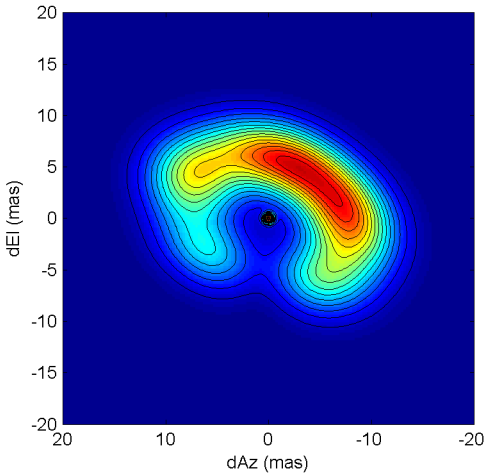



# What can we trust?

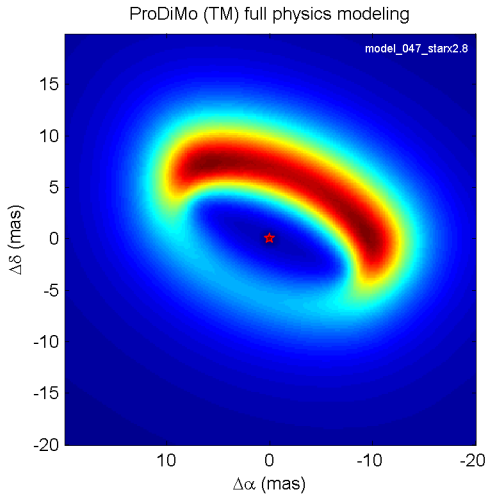
Image Reconstruction




Model fitting



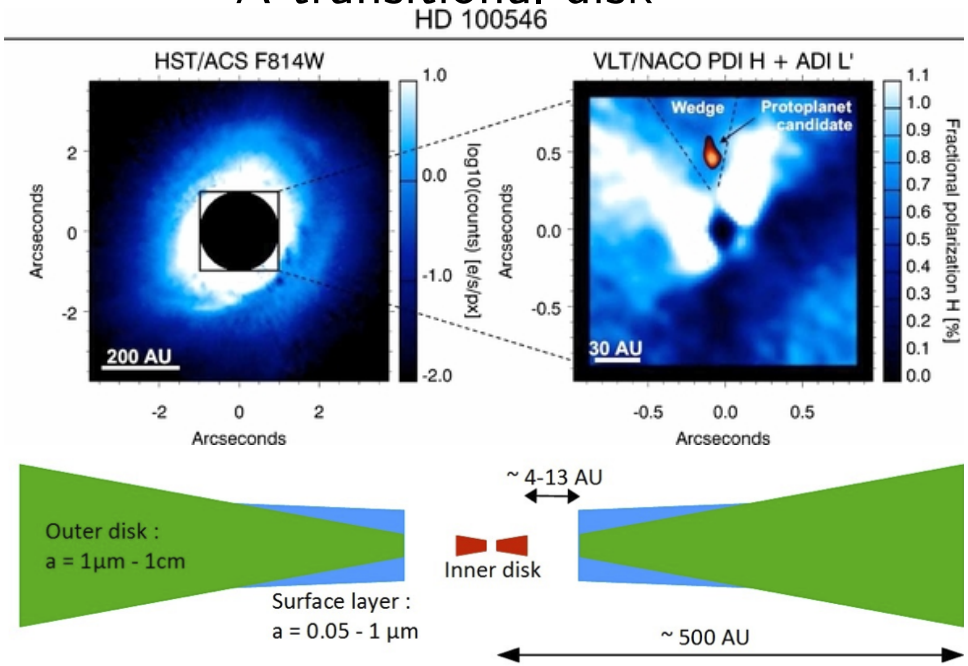

PRODIMO simulation



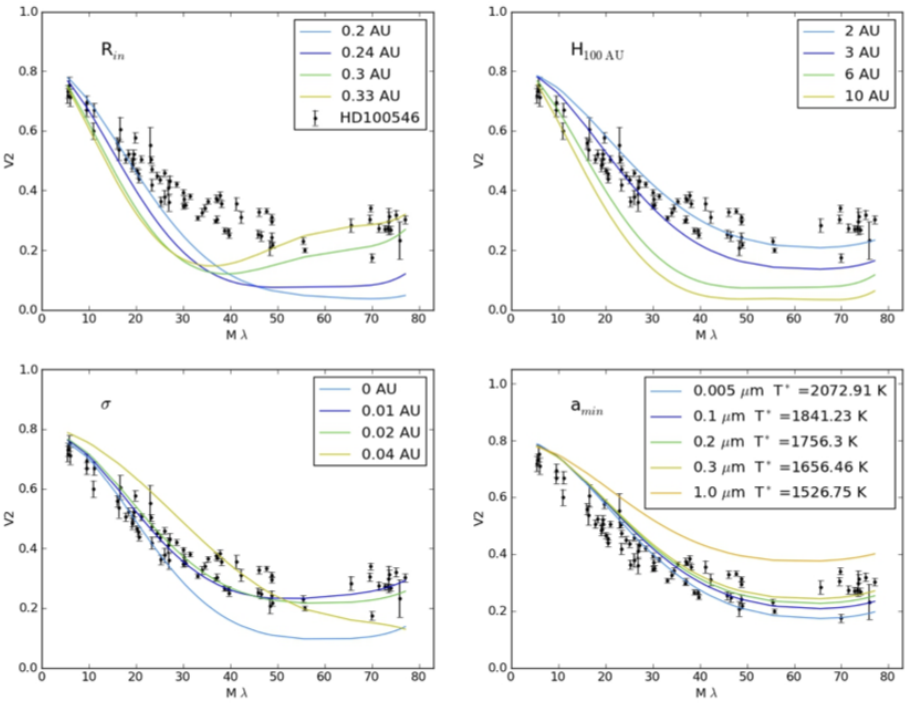

# The particular case of HD 100546

## Detailed Modelling

### A transitional disk



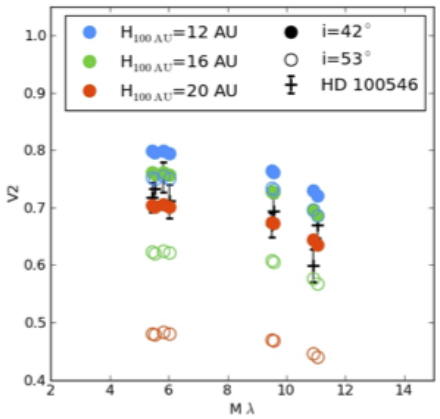

### MCFOST (Pinte+2008) simulations

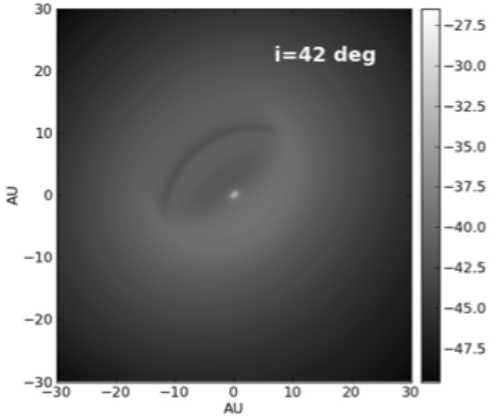


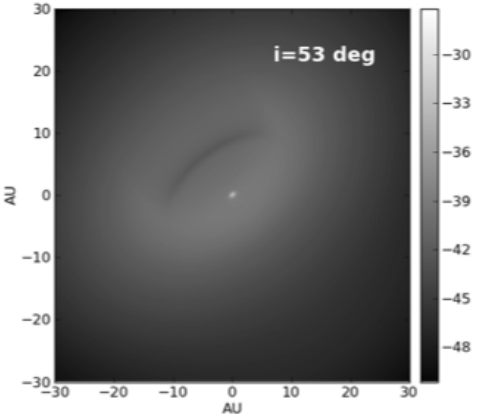

# The particular case of HD 100546

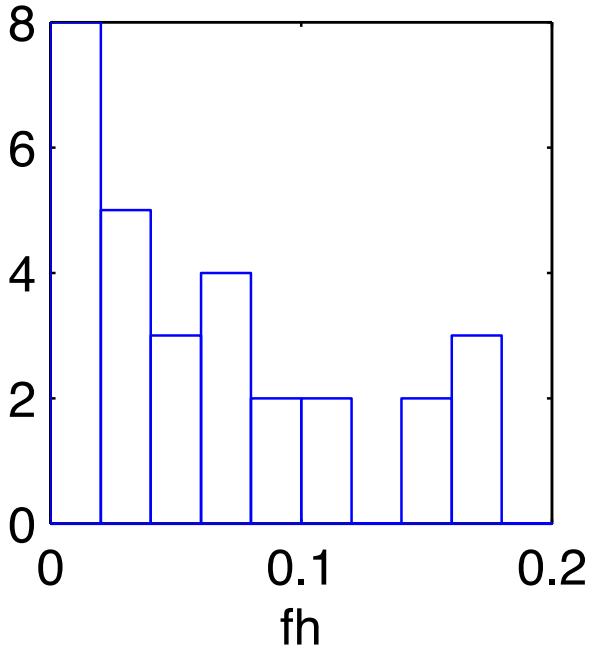
## The "halo" and the MIDI connection

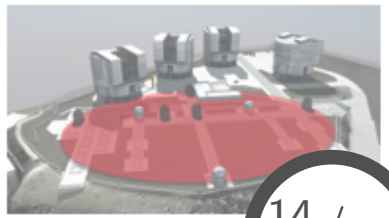
Are we seeing the inner rim of transitional outer disks?



# Conclusion

1. VLTI is an operational, efficient, "imaging" interferometer;
2. PIONIER LP sheds a unique insight at the very inner regions of the disk but angular resolution a clear limit;
3. Closure phase and visibility "rugosity" information still to be interpreted (axial symmetry?)
4. The combination of PIONIER and MIDI data (more?) is a challenging but exciting goal still to be fulfilled;
5. MIDI legacy: "Phase 3" products database (ESO, JMMC);