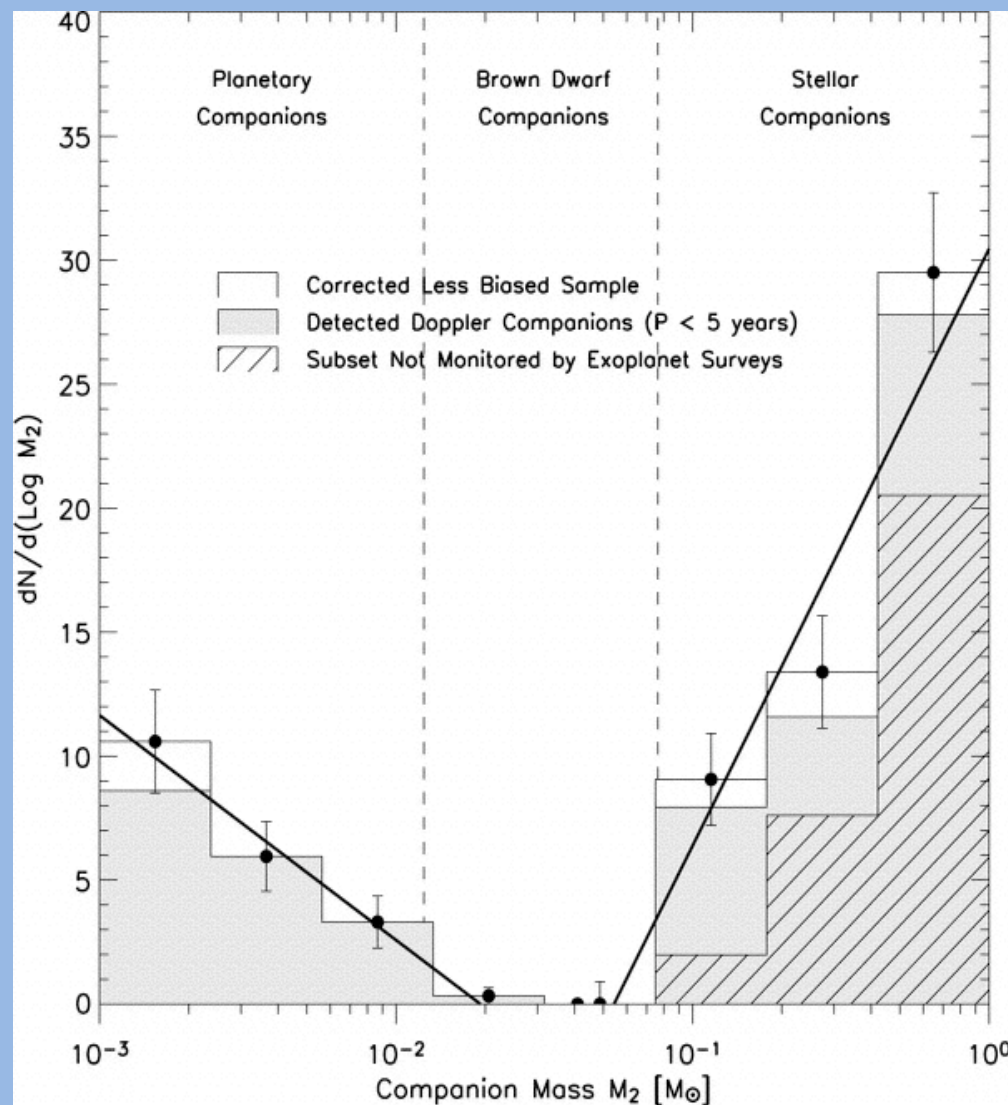


Direct Imaging of Sub-Stellar Companions and Characterisation of the Brown Dwarf Desert

Janis Hagelberg, Geneva Observatory

Scientific Goals

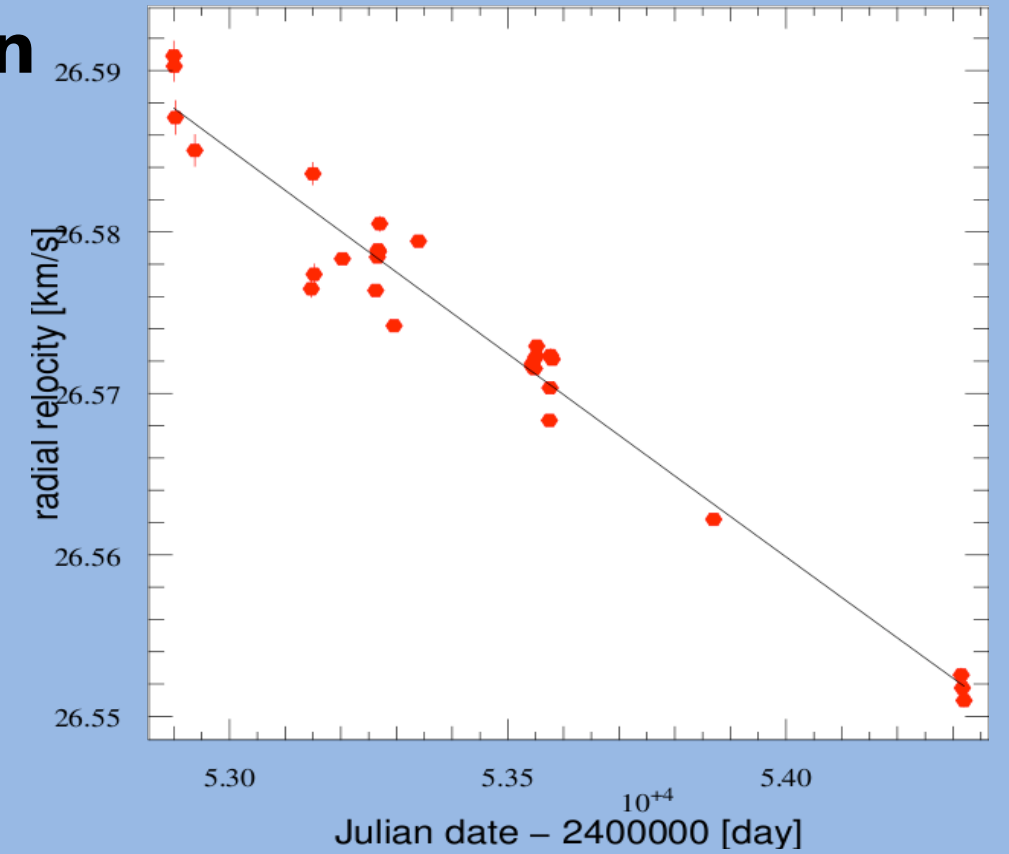
- Characterisation of the brown dwarf desert
- Atmospheric characterisation of brown dwarfs
- Preparation work for the SPHERE GTO



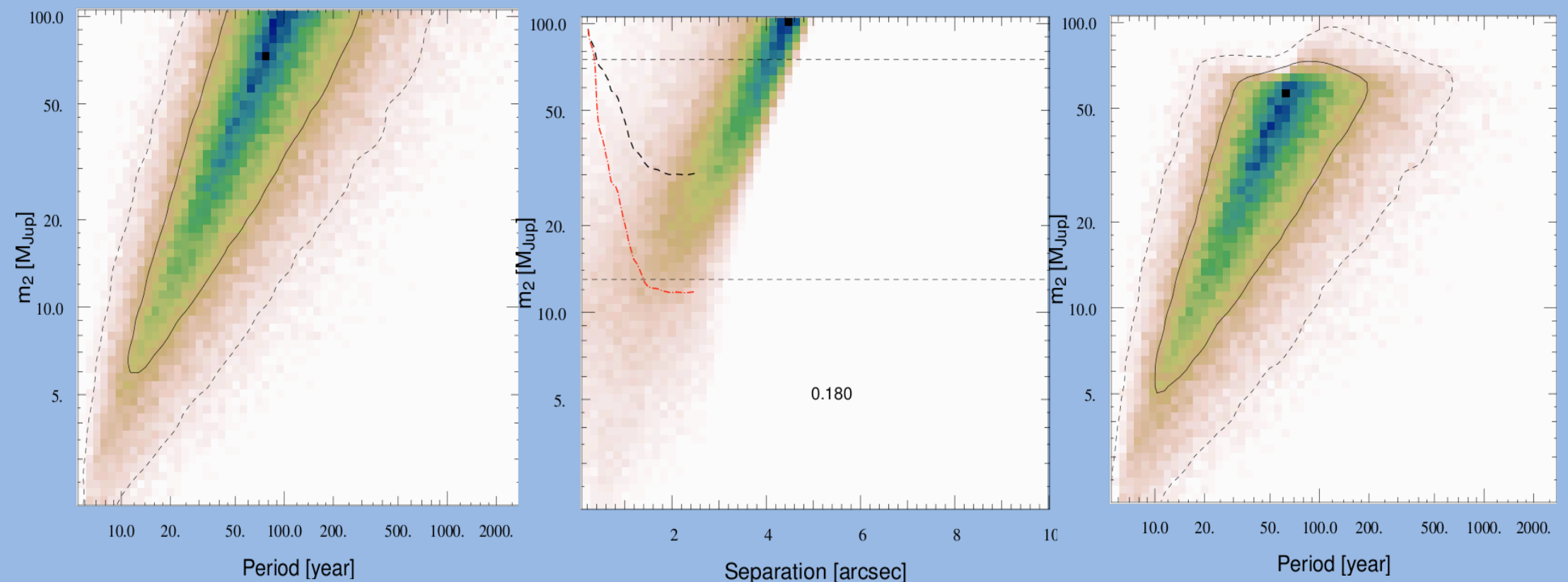
Mass distribution for companions of a sample of Sun-like stars within 50pc.
D. Grether and C.H. Lineweaver, ApJ 2006

Target Selection

- Radial velocity drifts selected within the HARPS and CORALIE database
- Discarding stellar companions and magnetic cycles
- Monte-Carlo probability maps generated to estimate detectability



Probability Maps



Mass-Period distribution

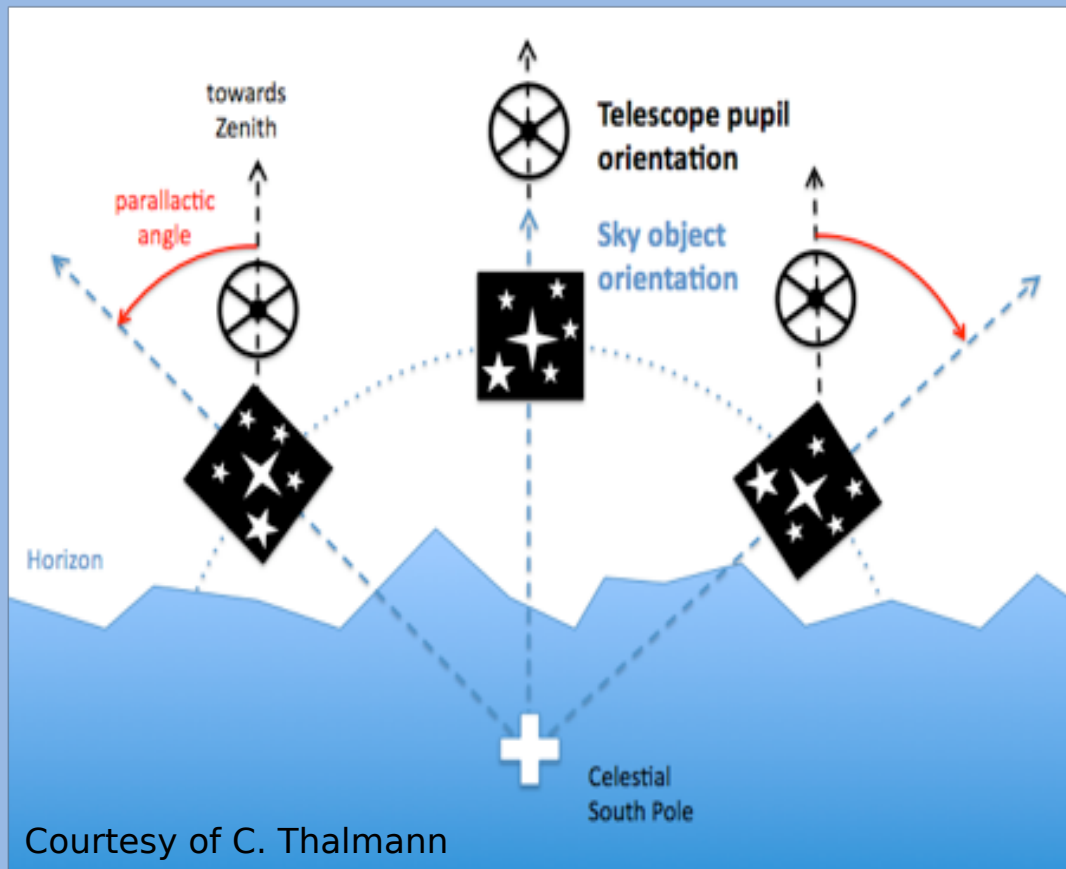
Detection probability

Mass-Period distribution in case of non-detection

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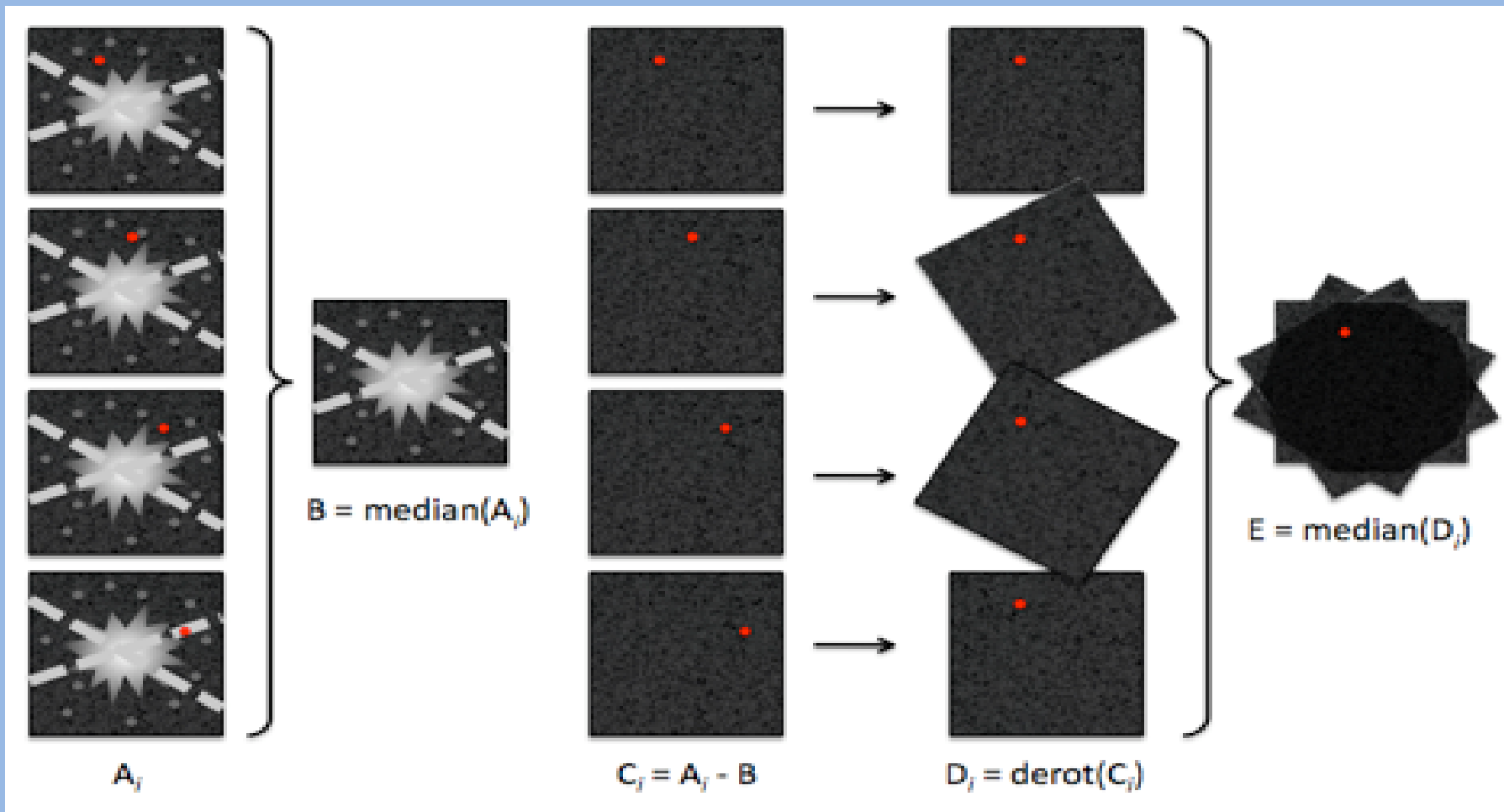
Detection Method



Courtesy of C. Thalmann

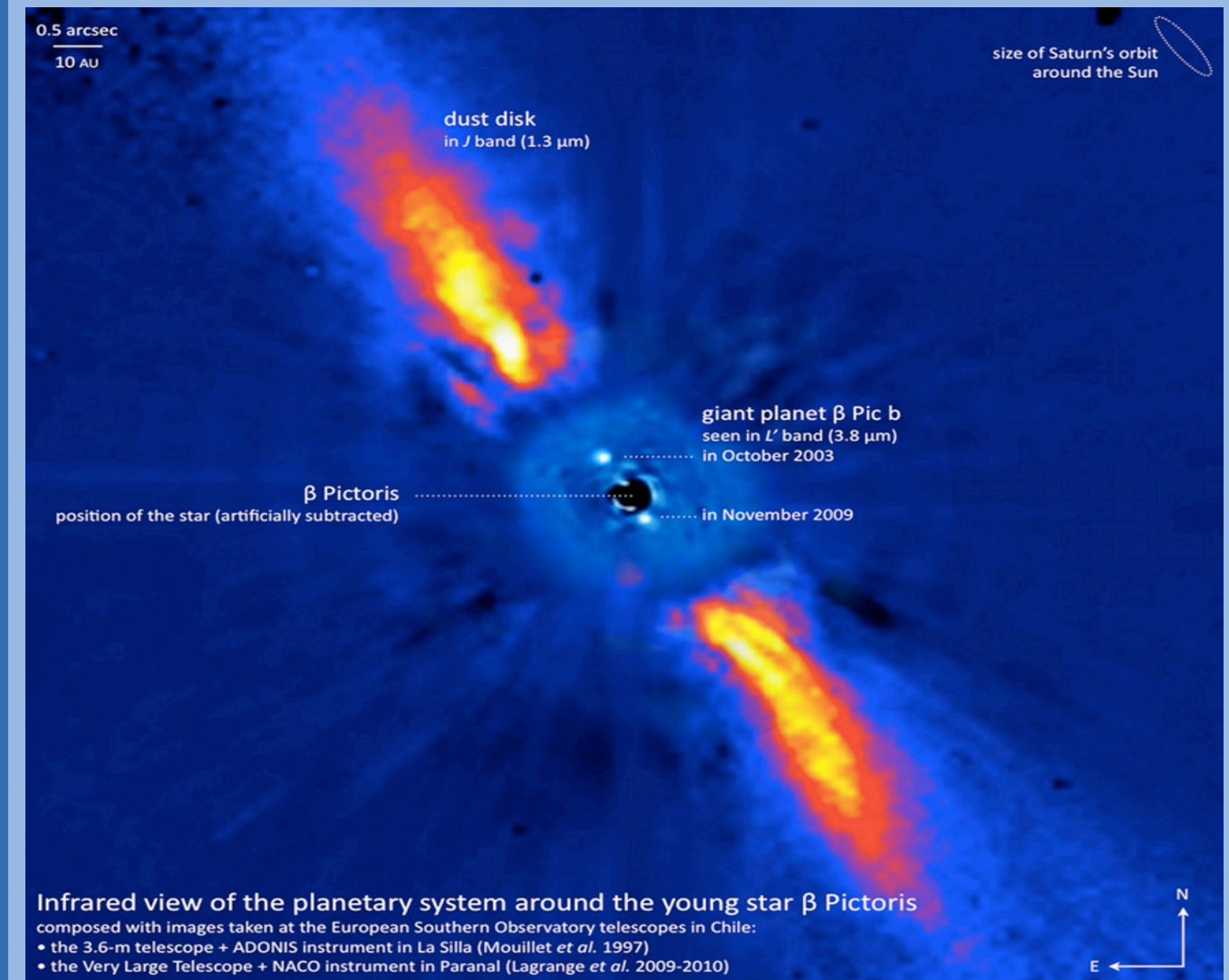
Field rotation in pupil tracking mode

Main steps of the angular differential imaging technique (ADI)



Courtesy of C. Thalmann

Results Based on ADI



Infrared view of the planetary system around the young star β Pictoris
 composed with images taken at the European Southern Observatory telescopes in Chile:
 • the 3.6-m telescope + ADONIS instrument in La Silla (Mouillet *et al.* 1997)
 • the Very Large Telescope + NACO instrument in Paranal (Lagrange *et al.* 2009-2010)

D. Mouillet *et al.* 1997, A.-M. Largange *et al.* 2009, 2010

Planet imaged through ADI around beta Pic

Analysis and Future Steps

- Photometry of the companion
- Distance to the host
- Determine precise detection limits
- Improvement of the SPHERE reduction pipeline