



Observatoire
de la CÔTE d'AZUR



UNIVERSITY OF
EXETER

Planetary transits beyond CoRoT: The case for Dome C observations

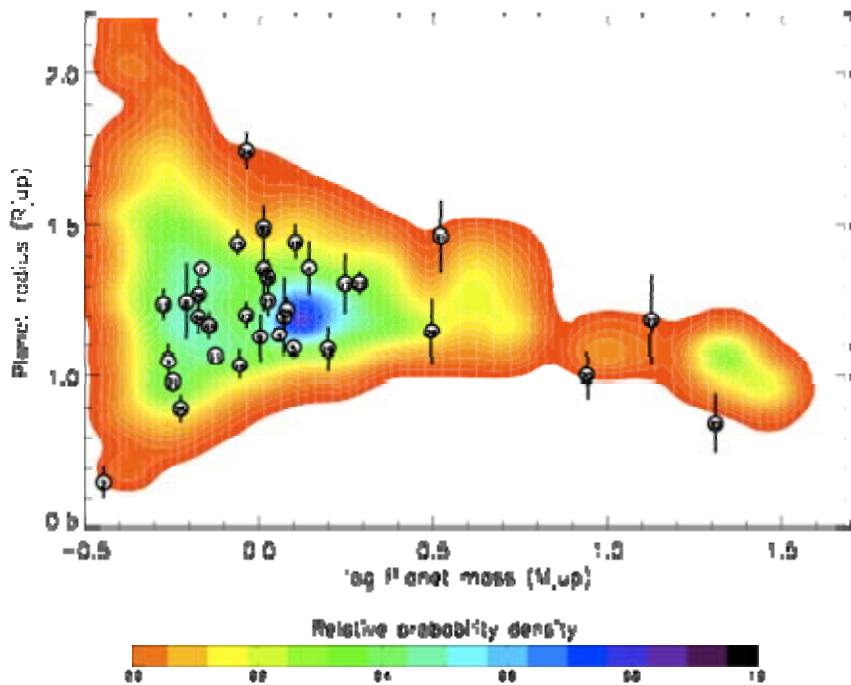
Guillot, Agabi, Crouzet, Daban, Gouvet, Abe, Fressin,
Fantei, Ottogalli, Rivet, Schmider, Peron, Valbousquet,
Bondoux, Chatilla, Blanc, Dugué, Roussel, Assus, Bresson,
Blazit, Le Van Suu, Merzougui, Fossat, Jeanneau, Rauer,
Erikson, Pont, Aigrain, Tothill



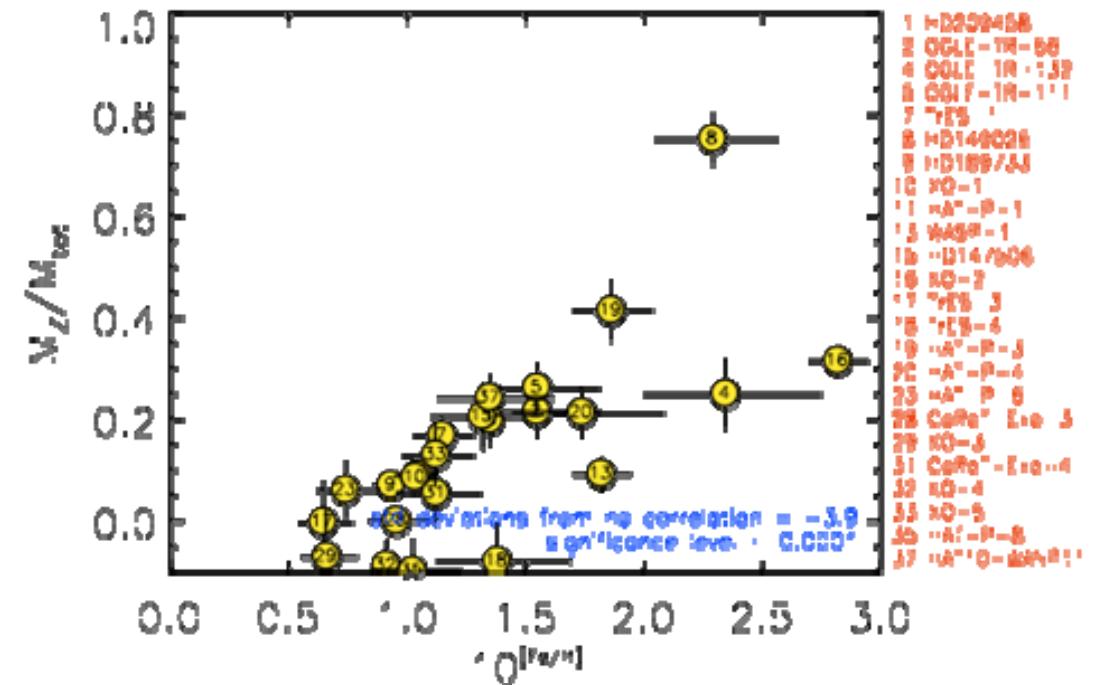
ANR



The power of transits: composition determination

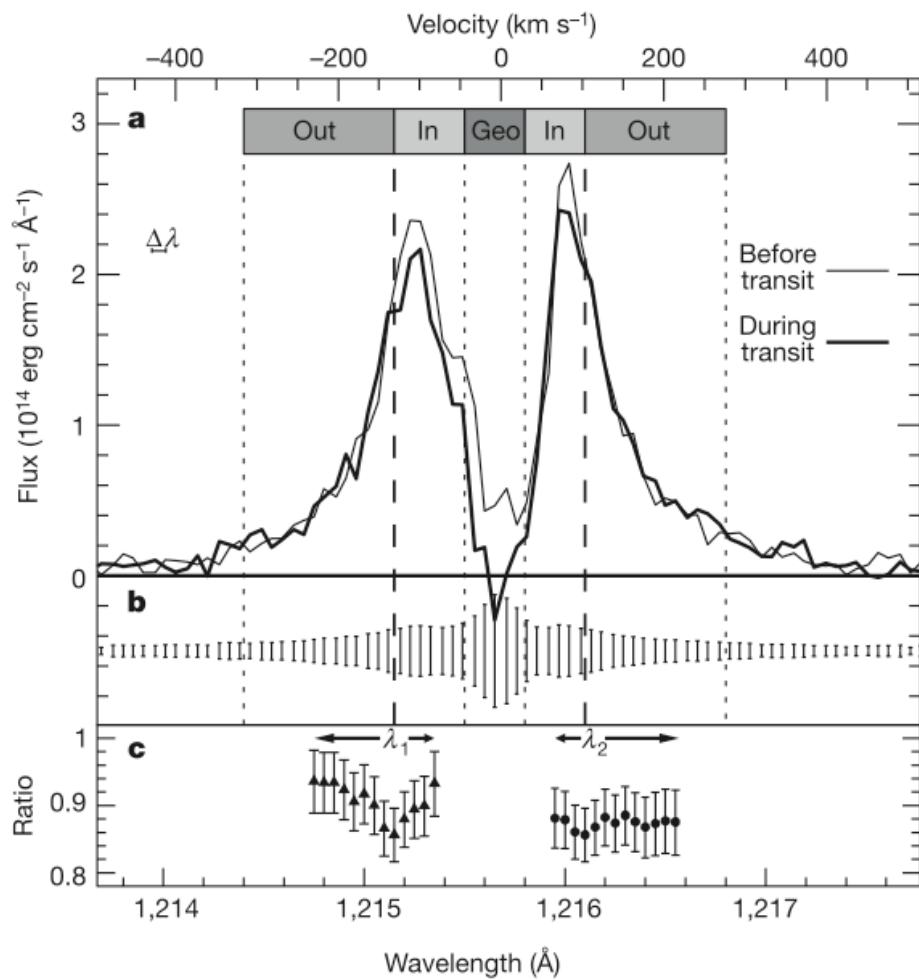


Fressin et al. 2009

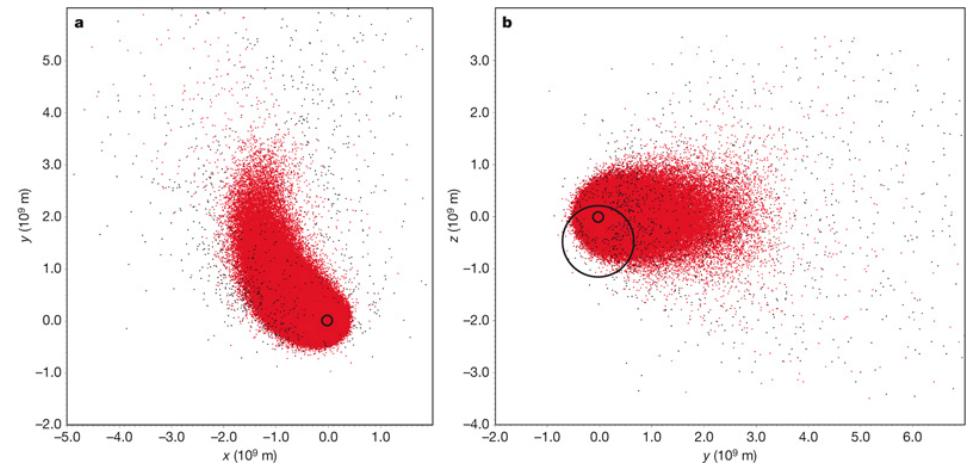


Guillot et al. 2009

The power of transits: mass loss

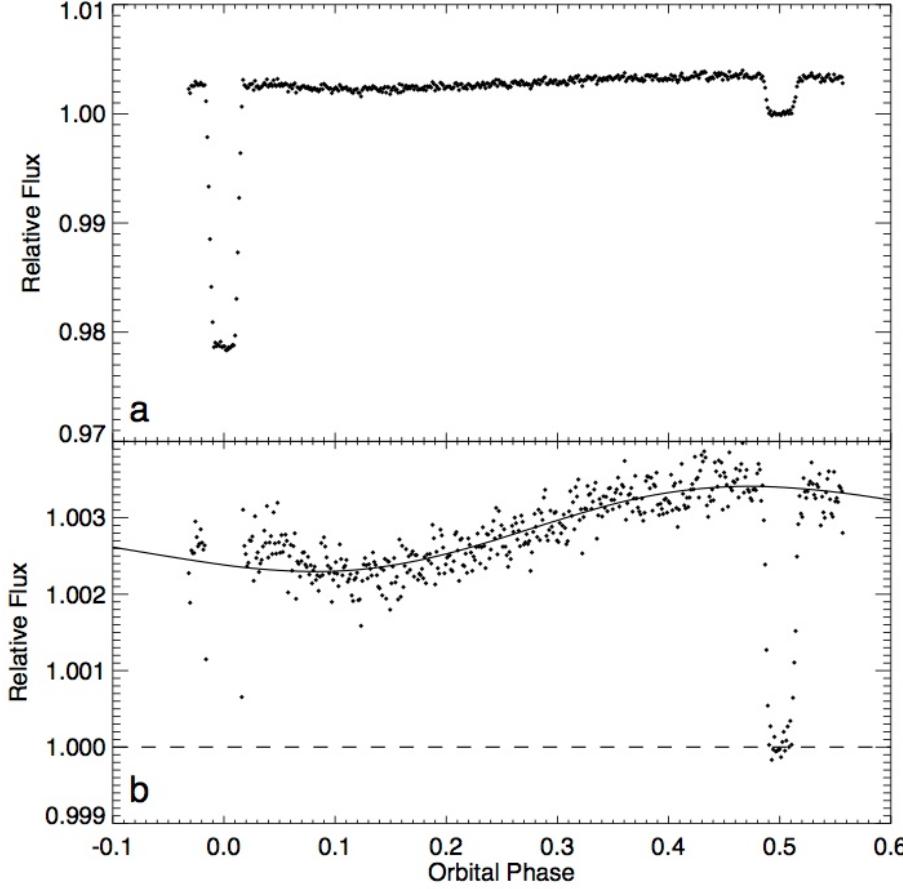


Vidal-Madjar et al. 2003

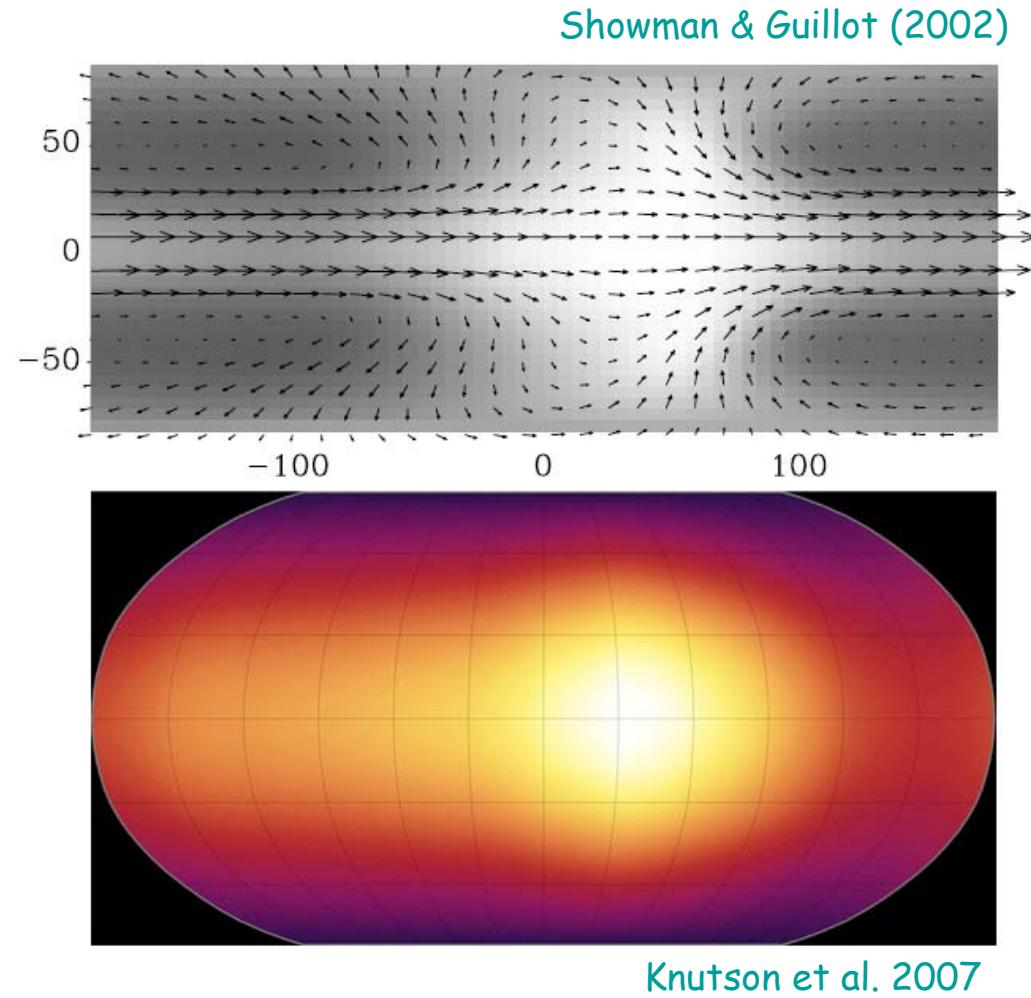


Hölsztröm et al. 2008

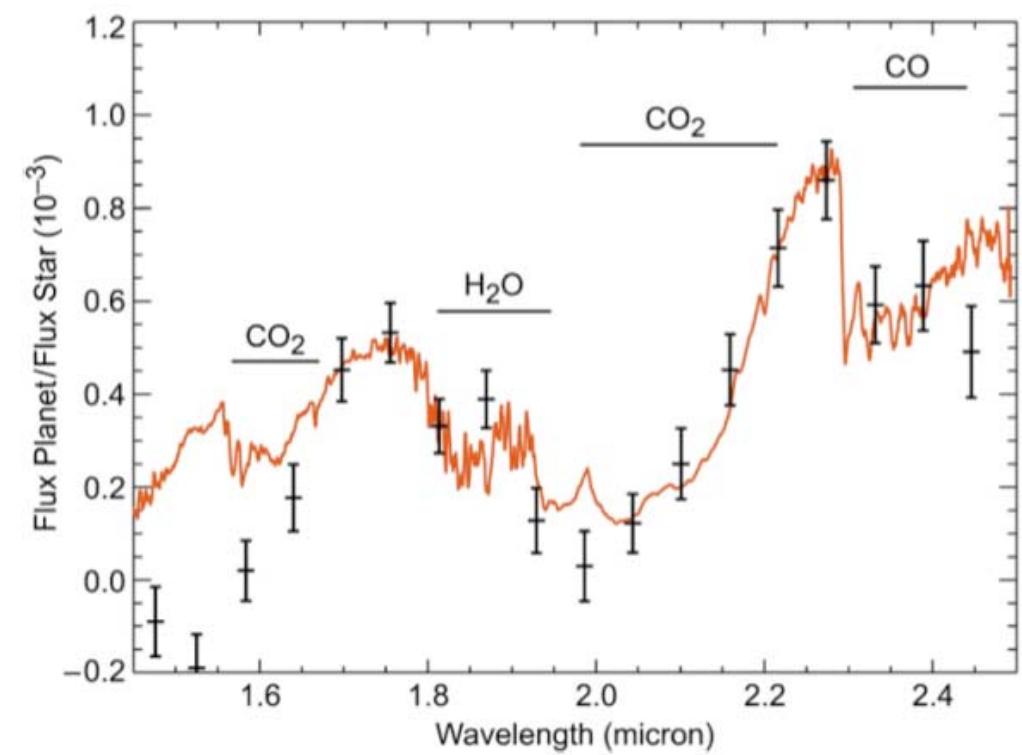
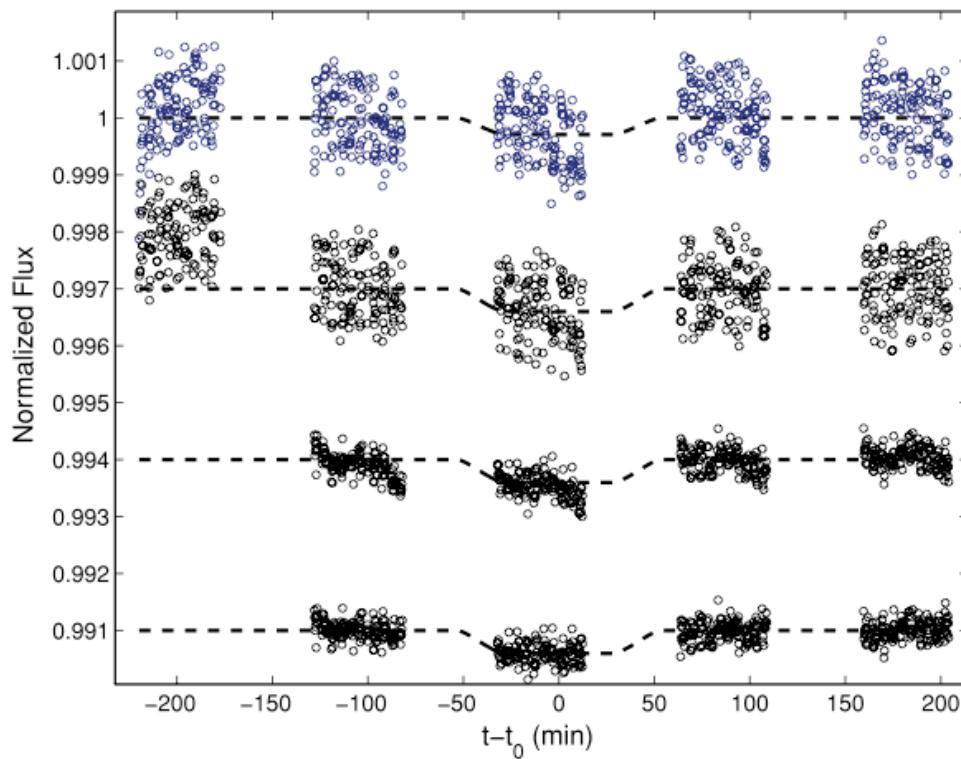
The power of transits: meteorology of an exoplanet



Knutson et al. 2007



The power of transits:spectrum of an exoplanet



Swain et al. 2009

The future

- Statistics: obtain many more transiting planets
- Longer orbital periods
- Smaller planets
- Satellites
-
- Spectra
- Polarization
- Radio emission, masers
-

How, where?

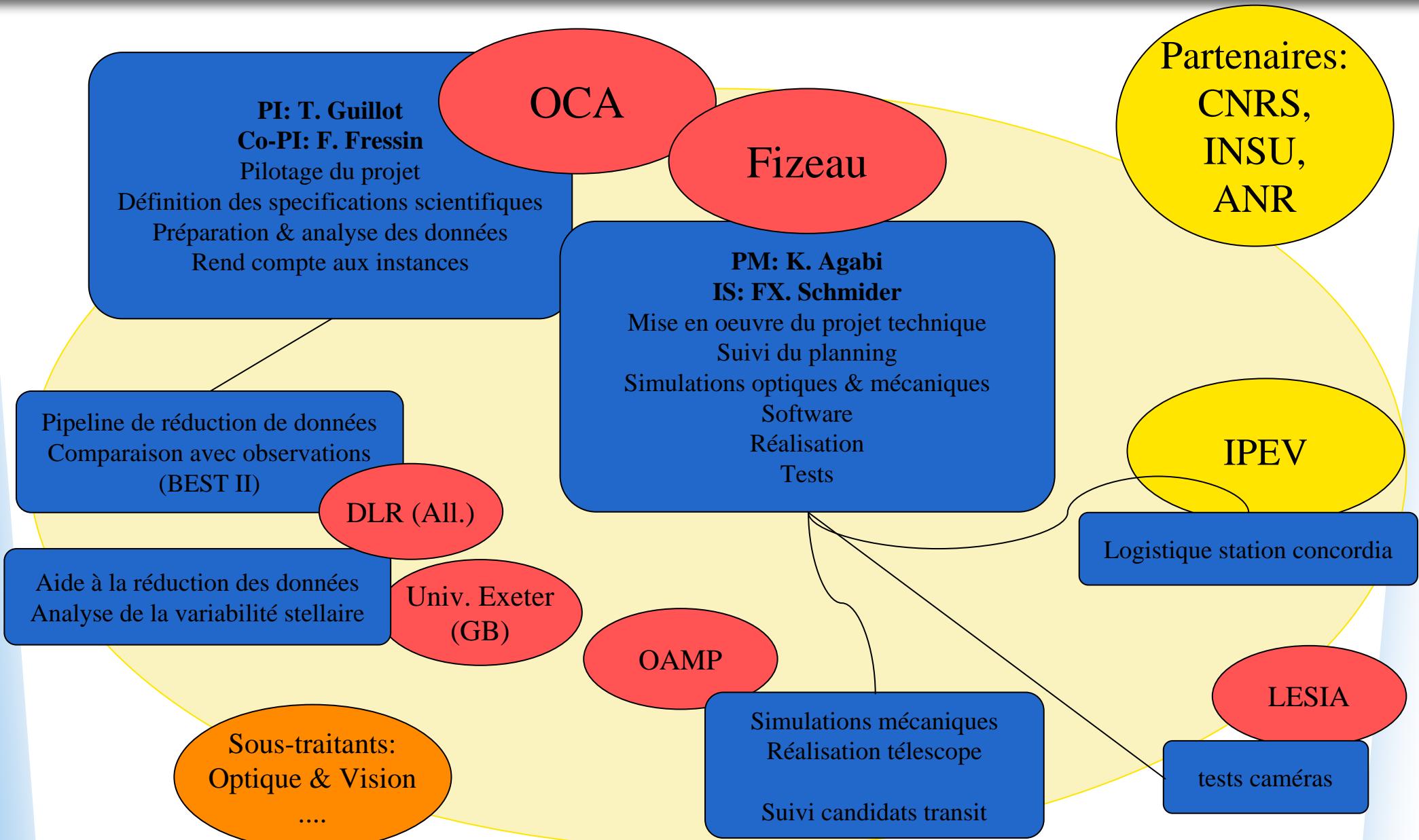
- “Rosetta stone” planets change everything
 - HD189733b: large planet around a bright star (Bouchy et al. 2005)
- Ground-based photometric observations now compete with space observations
 - Sing & Lopez-Morales; De Mooij & Snellen A&A 2009
 - see presentations & posters by Alonso, Gillon
- Concordia, Dome C, Antarctica
 - Base operated continuously (summer+winter) by France & Italy since 2005
 - Continuous night for 3 months
 - Excellent weather conditions -clear sky fraction >0.9 78% of the time (Mosser & Aristidi 2006)
 - Low scintillation
 - Very low seeing (but at $z>20-40m$)

ASTEP

Antarctica Search for Transiting Extrasolar Planets

- Objectives:
 - Determine the limits of transit photometry at Dome C
 - If the site is competitive with space, establish the base for a future ambitious project
 - Detect transiting exoplanets
- Two phases:
 - ASTEP South: fixed observation of the celestial South pole (10cm refractor)
 - ASTEP 400: automatized observation with a 40cm Newton telescope

ASTEP



ASTEP

ASTEP South

10cm refractor pointed towards
the celestial South pole
CCD: 4k x 4k
Thermal enclosure at 0°C
30s exposures



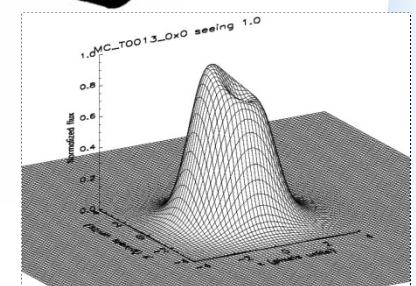
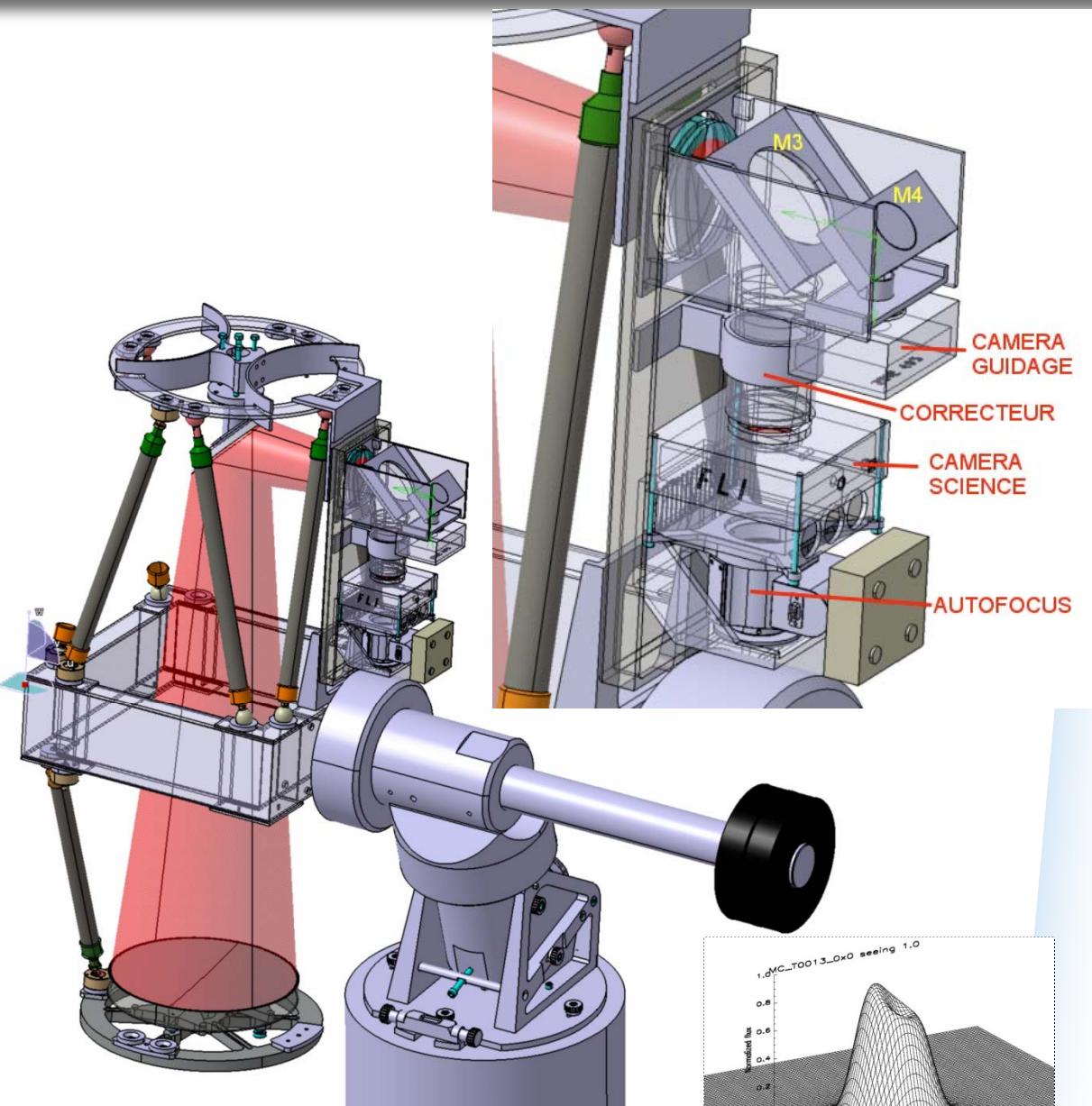
South pole field seen by ASTEP South

ASTEP South: first results

- 1005 hours of data
- Large variations in seeing & site temperatures
- High duty cycle
 - ◆ Lost observations:
 - Implementation (due to low T): until mid-June
 - 2 power cuts (several days)
 - 2 white-outs (several days)
 - ◆ Photometric quality appears to be excellent (TBC)
 - Crouzet et al. in preparation

ASTEP 400

- 40cm Newton
- CCD: 4k x 4k
- Zerodur M1 mirror
- Optimized Wyne corrector
- Autofocus for temperature variation compensation
- Guiding camera
- Astrophysics mount
- Petal-type dome



ASTEP 400

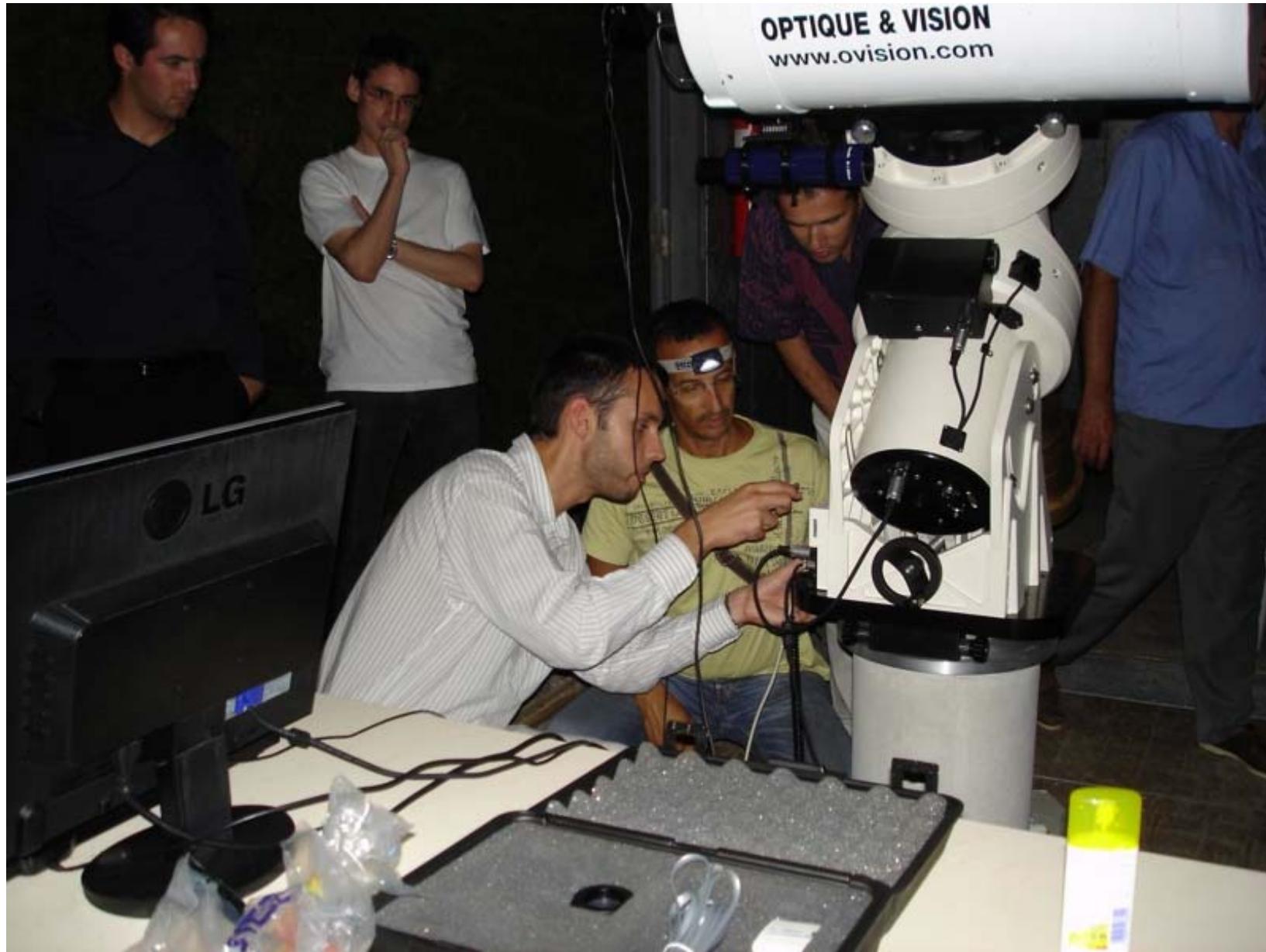
ANTARCTIC SEARCH FOR TRANSITING EXTRASOLAR PLANETS

ASTEP 400

DOME, MOUNT & TELESCOPE

J-B DABAN
(FIZEAU, UNIVERSITÉ DE NICE-SOPHIA ANTIPOLIS)

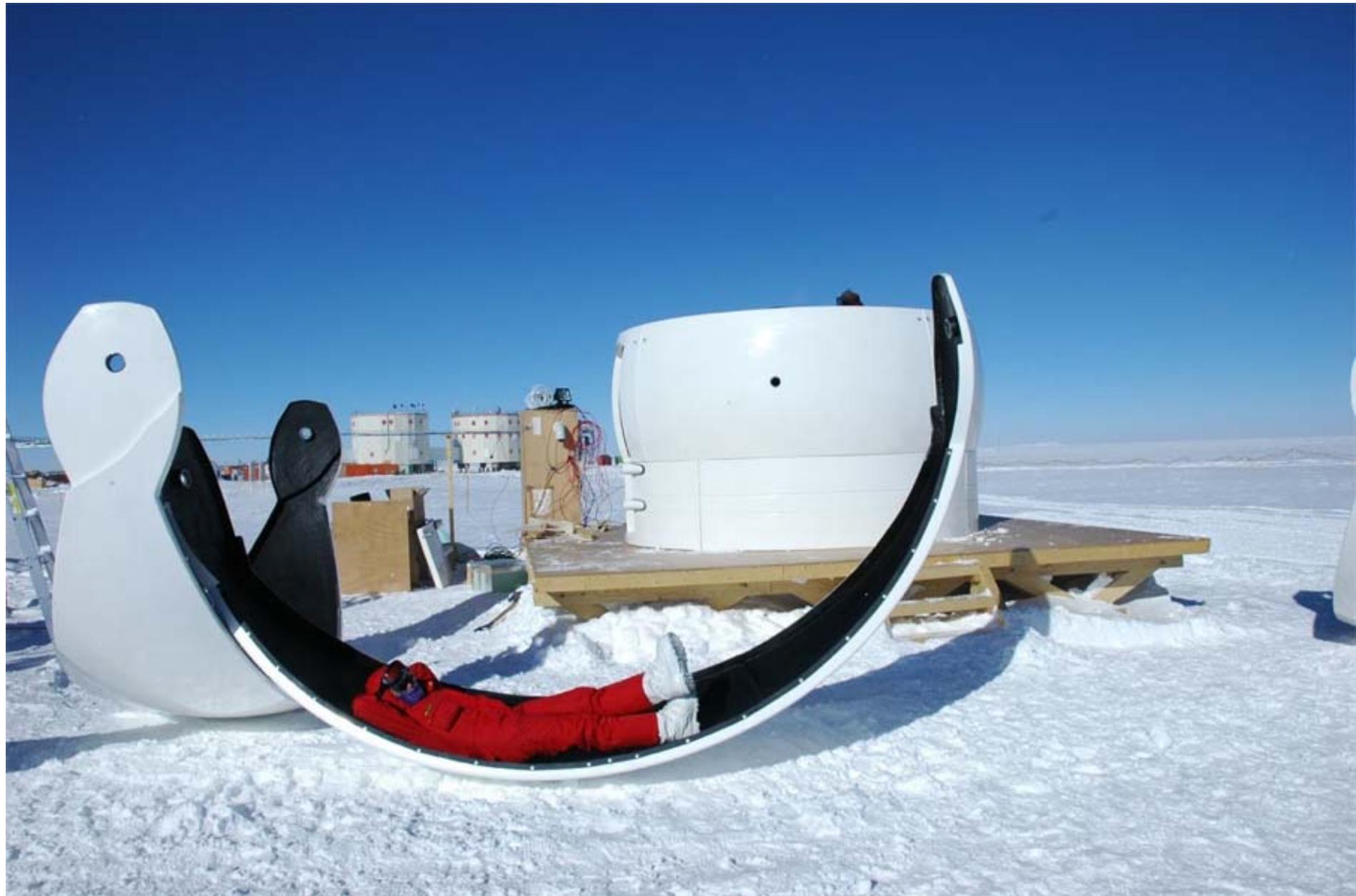
ASTEP 400: Tests in Nice



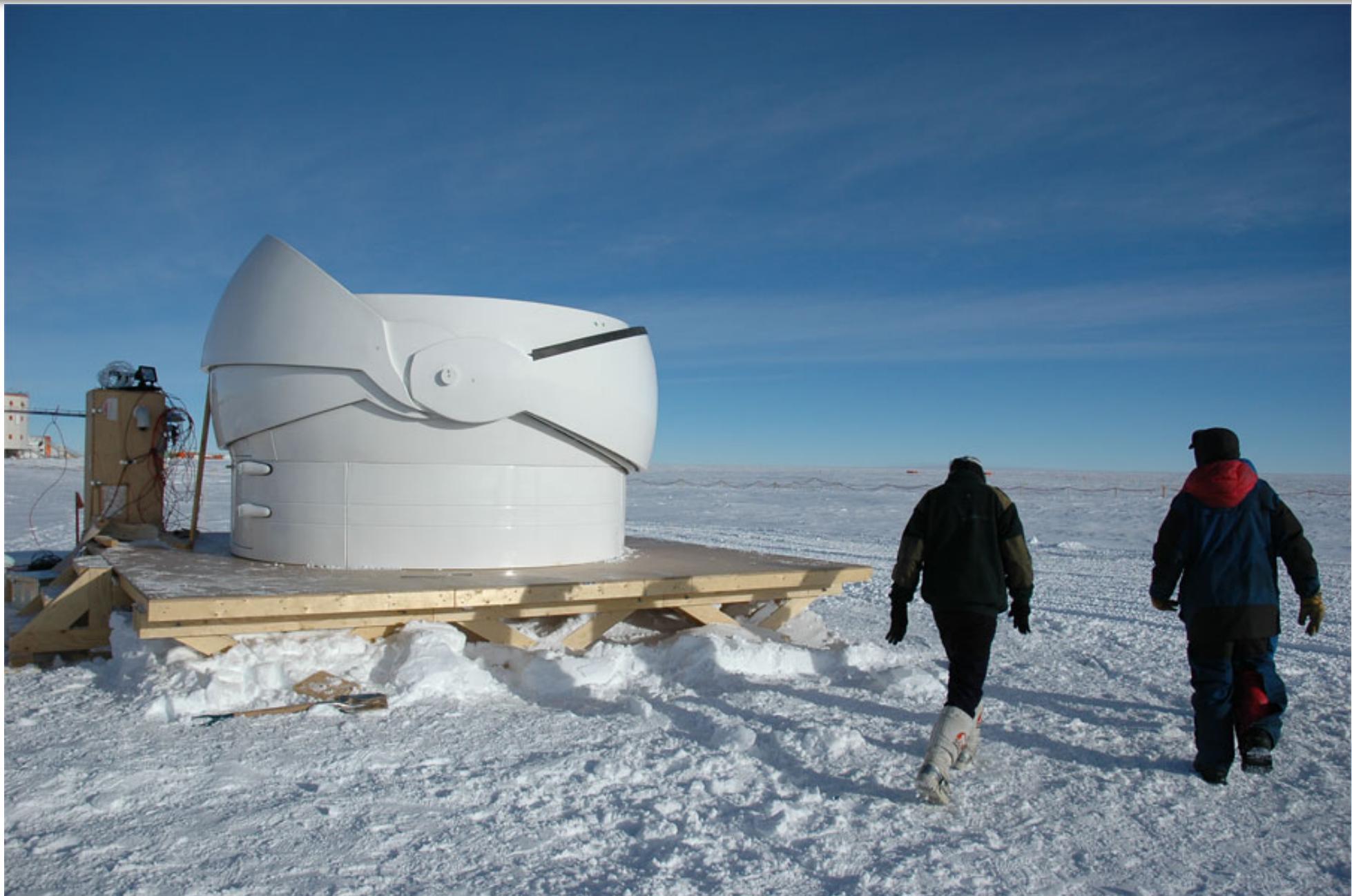
ASTEP 400: structure (first step)



ASTEP: News from Dome C



ASTEP: News from Dome C



ASTEP: News from Dome C



Observations with ASTEP 400 to begin April 2010!