SIAMOIS : a Fourier transform asteroseismometer for Dome C

Mosser Benoît et al.
benoit.mosser@obspm.fr

LESIA, Observatoire de Paris
SIAMOIS

Stands in french for: Sismomètre Interférentiel A Mesurer les Oscillations des Intérieurs Stellaires

- Asteroseismology at Dôme C – scientific goals
- Concept of SIAMOIS – simulations, performances, design
- Project – organisation, schedule, budget
Asterosismology at Dome C

- **Solar like** oscillations
  (spectral type F $\rightarrow$ K, class V and IV)
- **Spectrometric signature**

  $\rightarrow$ **Internal structure** analysis
Asterosismology at Dome C

- Solar like oscillations
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→ Internal structure analysis

- SIAMOIS and COROT
  - Different targets; stellar type G and K
  - Complementary observations: spectrometry / photometry
  - Follow up of the targets identified by the secondary program of COROT
Asterosismology at Dome C

- **Solar like** oscillations
  (spectral type F → K, class V and IV)
- Spectrometric signature

→ **Internal structure** analysis

- Unique performances at **Dome C**, with better time and photometric efficiency than a network
  - Possible continuous observation during several days (duty cycle ≈ 100 %)
  - Possible observation of an object up to 3 months (duty cycle → 80 %)
  - Efficient photometry
Instrumental principle

- FT seismometry: Doppler analysis deduced from the interferogram of the stellar visible spectrum

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- FT seismometry: Doppler analysis deduced from the interferogram of the stellar visible spectrum
  

→ Instrument:

- Compact (dimensions < 1 m)
- Stable (solid interferometer)
- Luminous (post-dispersion: 400 → 560 nm spectrum)
- No moving parts (special mirror)
- Automatic (for Antarctic use)
Optical design of SIAMOIS
Performances with SIAMOIS
Performances with SIAMOIS

![Graph showing L/L\_sol vs T (K)](image)

- Log v\_osc (cm/s)
- L/L\_sol
- T (K)

Points labeled:
- alphaCen A
- Sun
- alphaCen B
Schedule and budget

End 2004:
- Interferometric principle ok (Mosser et al 2003, PASP 115, 990)
- Interferometric design ok

→ 2005, 2 tasks:
- Design of the complete instrument
- Construction of the interferometer

Estimated budget ∼ 400 kE
Dome C = unique site for asteroseismology

Asteroseismology = “big science” at Dome C with a 80-cm telescope

SIAMOIS at Dome C: robust principle; a rapid development is possible, participating to the construction of observations in astronomy at Dome C

Collaborations: LESIA, GEPI, IAP, DT, IAS, OCA, UNSA, Italie, IPEV+...

Experience of the COROT team

FT asteroseismometry = unique solution for multi-objects spectrometric observations