Involvement in the ground-based spectroscopy ESO / OHP / Calar Alto Large Programme
• Aims

• How and who

• Current status and near future
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

AIMS

Ground-based multisite high-resolution spectra

Mode identification (l,m)

β Cephei, Be stars

δ Scuti, γ Doradus

Belgian contribution
Ground-based multisite high-resolution spectroscopic observations

1. Identification of m-values to the detected modes
2. Detection of high-degree l modes
3. Help in the identification of low-degree modes

Perfectly fitting the expertise of the KULeuven team!
1. Teams

2. Instruments and runs

3. Data analysis techniques
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

HOW and WHO

Belgian contribution

**Duplicate independent analyses for the same star**

**Share know-how**
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

HOW and WHO

Belgian contribution

Leuven / $\beta$ Cephei + $\delta$ Scuti
+ $\gamma$ Doradus + Be
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

INSTRUMENTS and RUNS

Belgian contribution

ESO Large programme:
15 nights (10+5) per semester for 4 consecutive ESO periods (1.5 year of CoRoT lifetime)

SOPHIE@1.92m at OHP
Philippe Mathias

FOCES@2.2m at Calar Alto
Pedro Amado

FEROS@2.2m at La Silla
Ennio Poretti
**Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme**

**INSTRUMENTS and RUNS**

- **Belgian contribution**
  - SOPHIE@1.92m at OHP
    - Philippe Mathias
  - FOCES@2.2m at Calar Alto
    - Pedro Amado
  - FEROS@2.2m at La Silla
    - Ennio Poretti

First run: Winter 2006-07
Data analyses ongoing

Second run: Summer 2007
INSTRUMENTS and RUNS

SOPHIE@1.92m at OHP
Philippe Mathias

FOCES@2.2m at Calar Alto
Pedro Amado

FEROS@2.2m at La Silla
Ennio Poretti

Fabien CARRIER
FEROS run (25 June – 5 July)
Help for FEROS data reduction

Belgian contribution
Spectroscopic Mode Identification

- Moment method
- Pixel-by-pixel method
- Line-profile fitting technique

developed by
Conny AERTS, Joris DE RIDDER,
Maryline BRIQUET and Wolfgang ZIMA
**CURRENT STATUS**

**First run (Winter 2006-07)**

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<th>V</th>
<th>Sp.</th>
<th>Notes</th>
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<td>SB2</td>
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<td>F2V</td>
<td>Solar-like; double system</td>
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<td>Be, SB2</td>
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<td>B5</td>
<td>Eclip. (Hipparcos variable)</td>
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**Belgian contribution**

**First run (Winter 2006-07)**

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<td>Be, V739 Mon</td>
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</table>
225 high-resolution echelle FEROS@2.2m spectra covering 96 hours

S/N: 70 – 200

Wavelength range: 3500 – 8800 Å

9 selected unblended lines are combined → S/N of ~ 500

Night of January 6th, 2007
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

HD 50844 – δ Scuti star – IR01/LRa1

Wolfgang ZIMA

Belgian contribution
Ground-based spectroscopy ESO/OHP/Calar Alto Large Programme

HD 50844 – δ Scuti star – IR01/LRa1

15 frequencies between 5 and 17 c d\(^{-1}\)

RV amplitude between 0.2 and 0.7 km s\(^{-1}\)

Normalized power

Wolfgang ZIMA

Frequency c/d

Normalized power

Window function

Line profile high-degree modes

First Moment low-degree modes

Frequency c/d

Belgian contribution
Most of the modes apparently prograde

I-values up to 10

Wolfgang ZIMA

Belgian contribution
Second run (Summer 2007)
LRc1

HD 181555  δ Scuti  ESO – OHP – Calar Alto

Wolfgang ZIMA

HD 180642  β Cephei  ESO – OHP

Maryline BRIQUET

HD 181231  Be  ESO

Belgian contribution
Involvement in the ground-based spectroscopy ESO / OHP / Calar Alto Large Programme