High-resolution surveys of high-mass stars before *Gaia*

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Sitges
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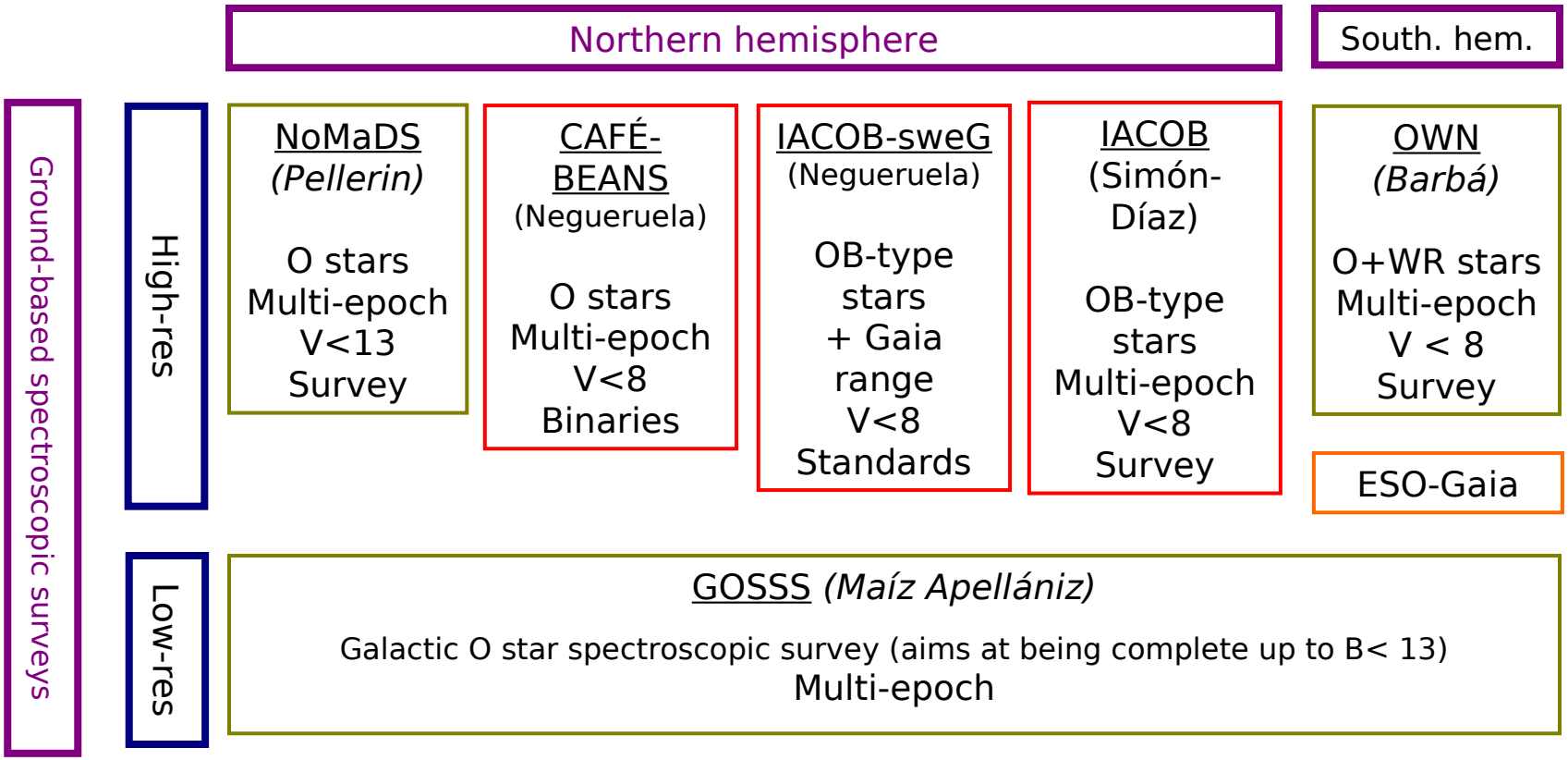
On behalf of ...

J. Maíz Apellániz (IAA/CSIC)
S. Simón-Díaz (IAC)

... and the massive star community ...

M. García, C. González, A. Herrero (PI IAC), J. Lorenzo, A. Marco, F. Najarro (PI CAB/CSIC), A. Sota, ...

High-mass star spectroscopic surveys



The IACOB project

PI: Sergio Simón Díaz

IACOB Spectroscopic database

Objective: Step forward in our knowledge of Galactic massive stars using a large, homogeneous, high-quality spectroscopic dataset and modern tools for the quantitative spectroscopic analysis of O and B-type stars

IACOB working packages:

WP-1: The IACOB spectroscopic database

WP-2: Line-broadening in OB stars (v sin$i$, pulsations?)

WP-3: Quantitative spectroscopic analyses ($T_{\rm eff}$, R, M, L, $\dot{M}$ ...)

WP-4: Abundances in OB-type stars

WP-5: Massive binary/multiple systems

WP-6: Massive stars and the ISM (IS lines/bands and ionizing fluxes)

The IACOB project

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IACOB Spectroscopic database

The largest high-resolution, multi-epoch, homogeneous, spectroscopic database of Northern Galactic O and early-B type stars compiled to date

Instrumental configuration
Telescope: NOT2.56 m
Instrument: FIES
Fiber: med-res / low-res
Spect. range: 3800 - 7000 Å
Resol. power: 46000 / 23000
Sampling: 0.03 Å/pix
SpT & LC coverage
O4-B2 (I-V)
Some statistics
stars: 250
spectra: 1255
O stars: 153
B stars: 97

FIES@NOT - 2.5m

R =23000, 46000 (3900-7000 A)

SNR > 200

Future

~ 99% of the survey is complete.

Final observing run next week will allow to increase the number of detected binaries

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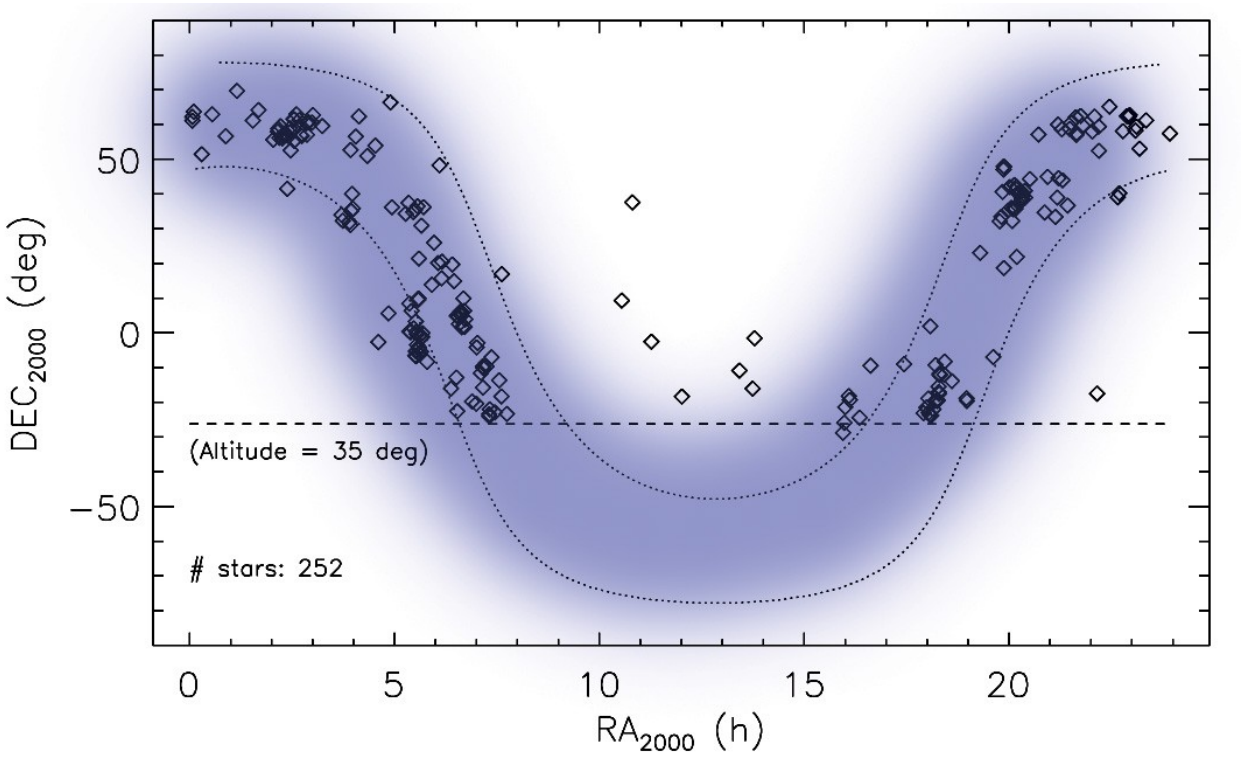
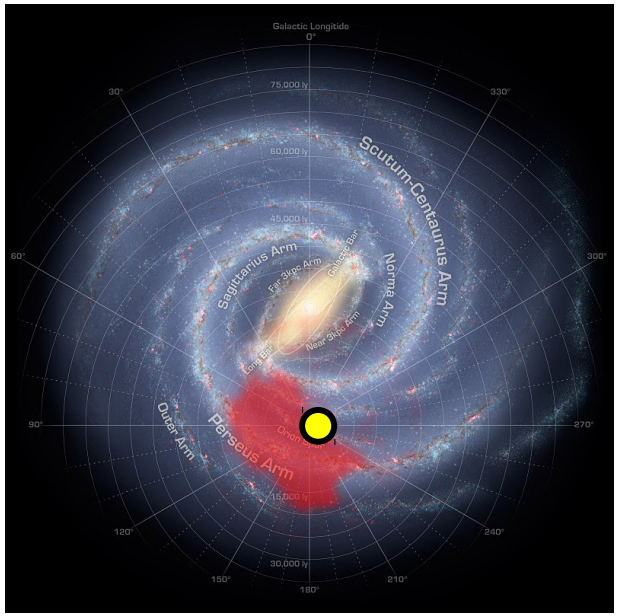


IACOB
Spectroscopic database



But does not include Gaia range!

The IACOB-sweG project

PI: Ignacio Negueruela Díez

IACOB supplemented with an extension to the *Gaia* range.

Aim: Building a grid of (~ 100) MK standards covering

- SpT: O4 – B9
- LC: V, IV, III, II, Ib, Iab, Ia

observed with HERMES @ the Mercator telescope

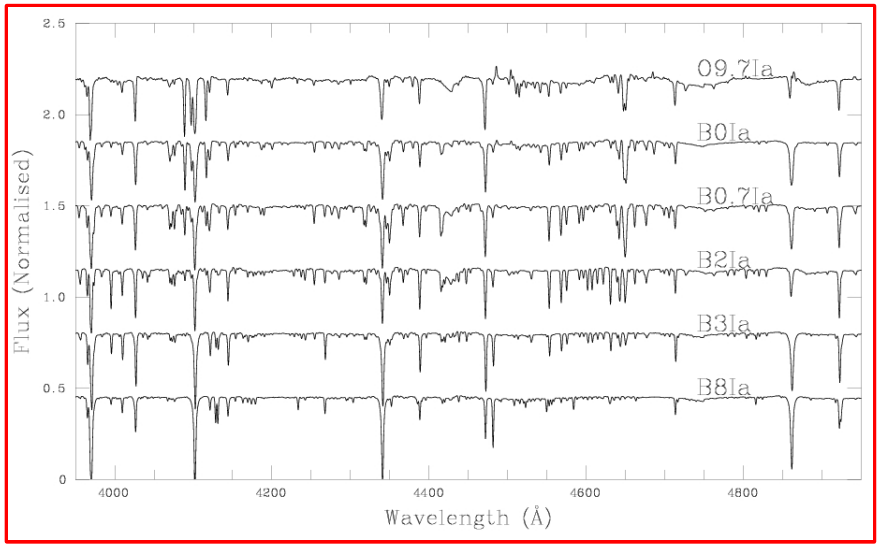
R = 85 000

(3700 – 9000 A)

Mercator Telescope
Instituut voor Sterrenkunde
K. U. Leuven

The IACOB-sweG project

PI: Ignacio Negueruela Díez

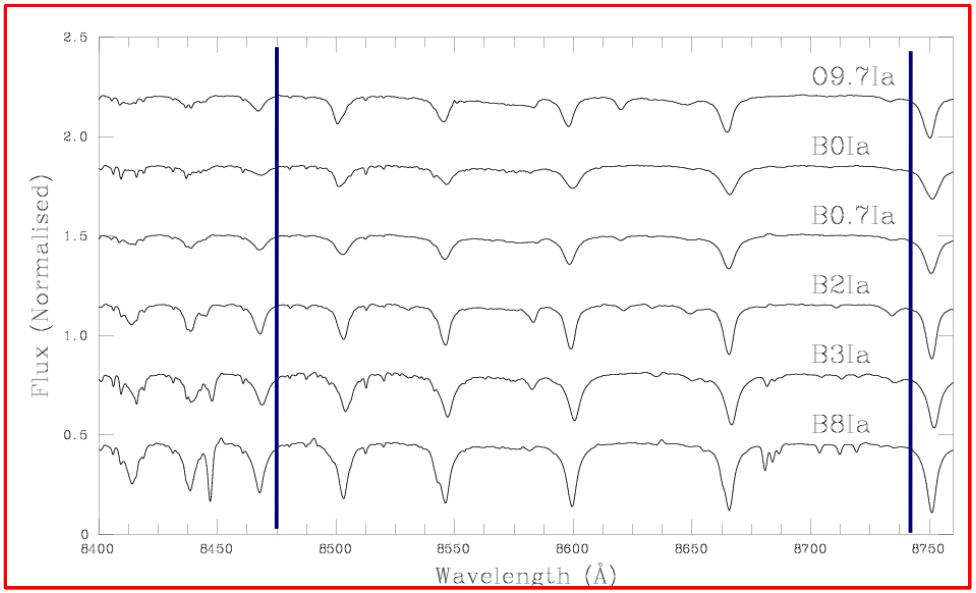


Objective

Developing classification criteria for OB stars in the *Gaia* spectroscopic range.

Future

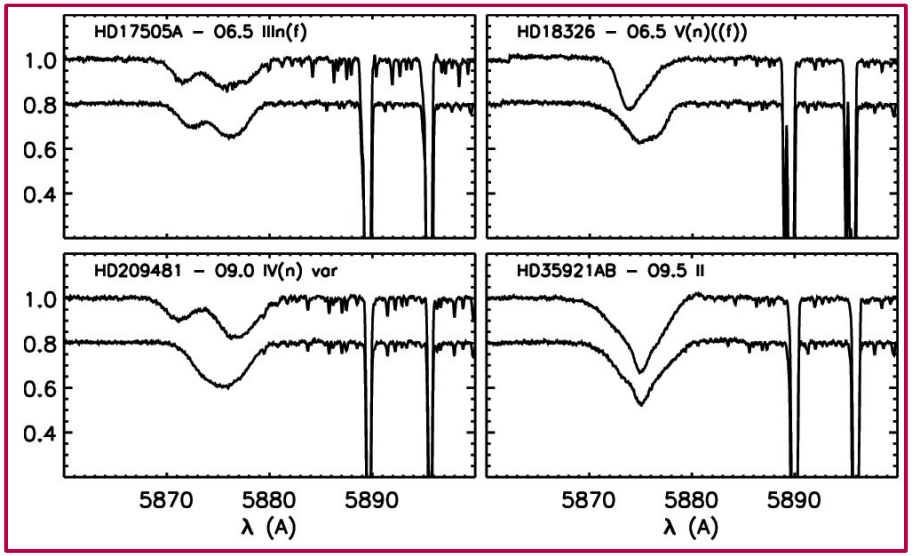
~ 80% of the survey is complete (bad luck with the weather). We expect to complete it next winter.



The CAFÉ-BEANS project

PI: Ignacio Negueruela Díez

In the IACOB data, many OB stars show clear signs of binarity when observed at high resolution.



- Unresolved binaries affect the parameters derived from quantitative analysis.
- Binary parameters (mass ratio, separation, ellipticity) provide unmatched insight into star formation process.
- Binary parameters provide input for evolutionary models.
- Eclipsing binaries allow the calibration of basic stellar parameters

The CAFÉ-BEANS project

PI: Ignacio Negueruela Díez

CAFÉ (Calar Alto Fiber-fed Échelle) Binary Evolution Andalusian Northern Survey.

Aim: Detecting binarity in all O-type stars brighter than B = 8.

Solving those binaries and some other very interesting cases (up to 100 targets)

observed with CAFÉ @ the 2.2 m Calar Alto telescope

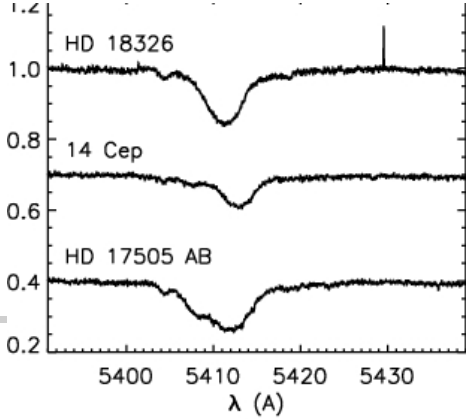
R = 60 000

(3800 – 9200 A)

Complementario a OWN

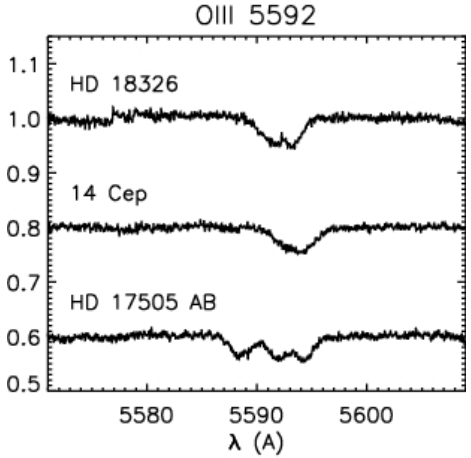
CAFÉ-BEANS

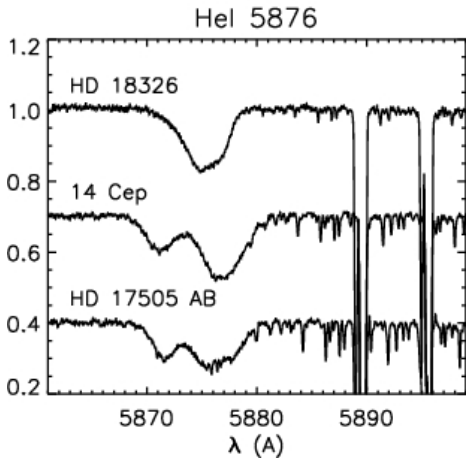
On-going survey



- 10 half nights observed during 12B
- 10 half nights given during 13B (first 3 lost to weather)

- Reduction pipeline developed by J. Maíz.
- The instrument is delivering the expected SNR.
- It is looking good.

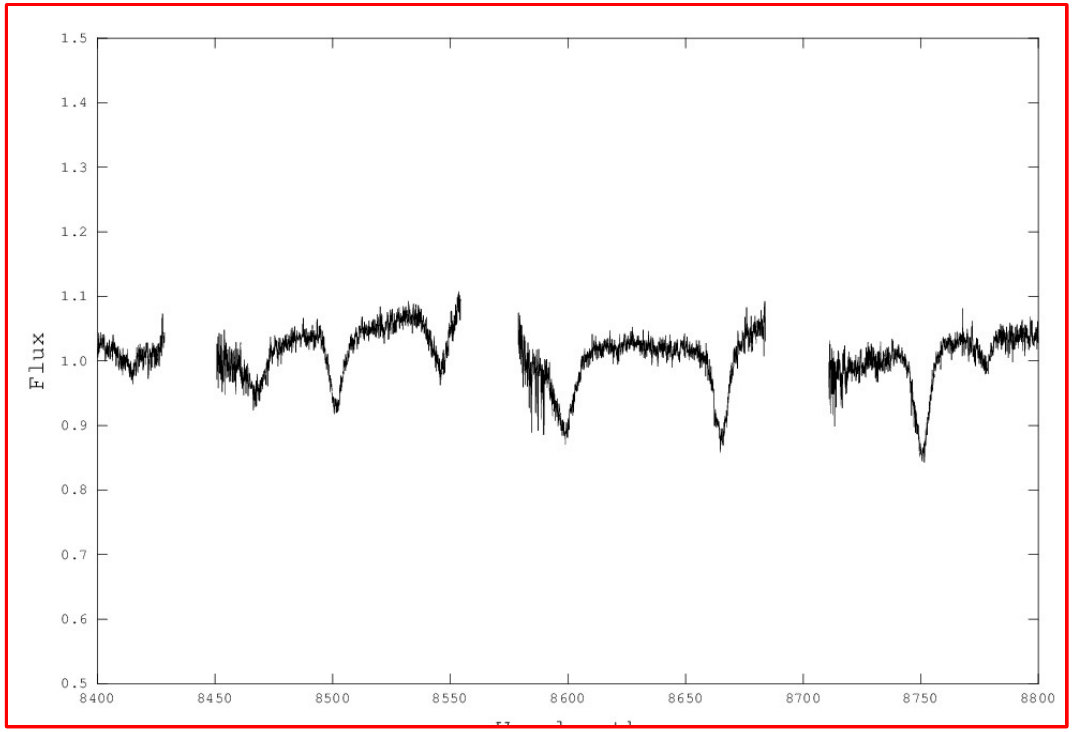




- Algorithm for predicting the “most interesting” targets for each night allocated.
- We need ~ 1 more year to start producing results.
- Big inter-order gap in Gaia range, but still very good complement to IACOB-sweG.

CAFÉ-BEANS

On-going survey



- Big inter-order gaps in Gaia range, but still very good complement to IACOB-sweG.
- A different sample of binary systems and more obscured stars.

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