Slowly Pulsating B star candidates in the CoRoT seismo field of the LRc01

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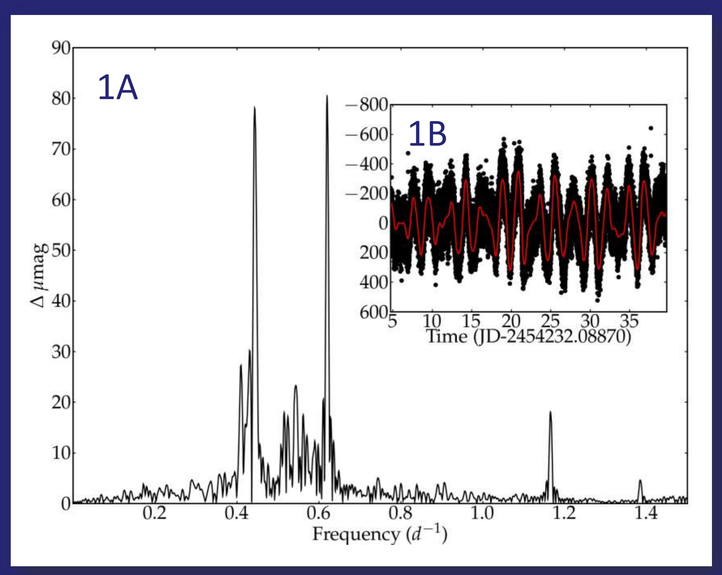
We report here the analysis and interpretation of the light curves of two SPB-candidates observed in the CoRoT seismo field of the first long run: HD 181440 and HD 182198. We present the results of a detailed frequency analysis and, thanks to the available spectroscopic constraints (metallicity, effective temperature and surface gravity) we compare the observed and theoretical instability domain.

HD181440 corot_8641 V=5.5



1A: Scargle periodogram of the difference between smoothed versions of the CoRoT light curve ('*resolution plane*', Otazu et al. 2004 MNRAS 351). The original light curve is shown in the inset **(1B)** as black dots. Taking the difference between distinct smoothings (red line) removes jumps as well as long term trends.

Accepted frequencies

f1 = 0.439 c/d	A1 ≈ 80 μmag
f2 = 0.621 c/d	A2 ≈ 75 μmag
f3 = 1.166 c/d	A3 ≈ 50 μmag
f4 = 0.544 c/d	A4 ≈ 20 μmag

f3 ≈ f2+f4

Spectroscopic constraints

T_{eff} = 11200 ± 1150 K
logg = 3.5 ± 0.2
Vsini = 60 ± 5 km/s
Z ≈ 0.012

STEPS OF OUR ANALYSIS

(see poster by Degroote el al.)

Due to jumps and trends in the light curves, the frequency analysis is performed in different resolution planes
(Otazu et al. 2004 MNRAS 351)

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List of accepted frequencies

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Check for harmonics & combination frequencies

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T_{eff}, logg, vsini + detailed ab. analysis from spectroscopy
(see poster by Niemczura et al)

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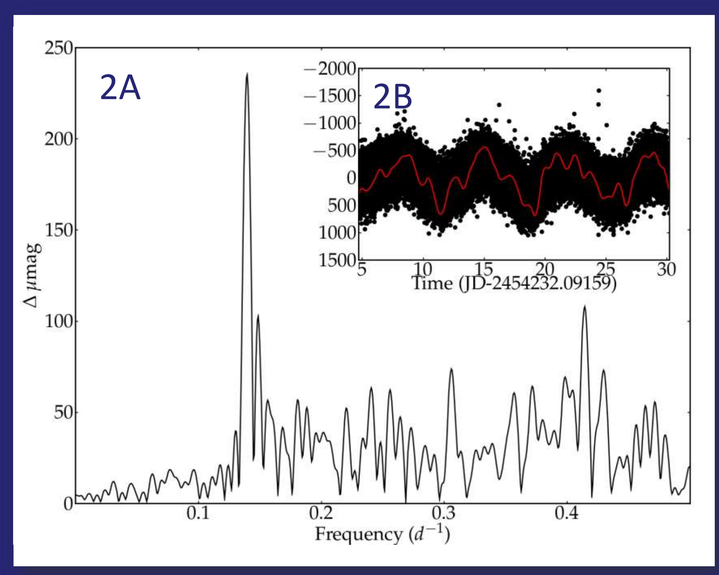
Comparison with theoretical instability domains

HD182198 corot_8872 V=7.9



2A: Scargle periodogram of the difference between smoothed versions of the CoRoT light curve ('*resolution plane*', Otazu et al. 2004 MNRAS 351). The original light curve is shown in the inset **(2B)** as black dots. Taking the difference between distinct smoothings (red line) removes jumps as well as long term trends.

Accepted frequencies

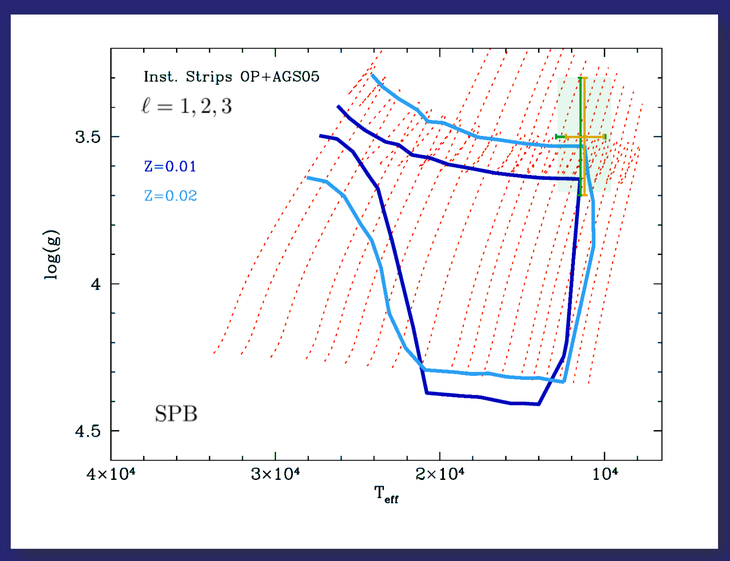
f1 = 0.139 c/d	A1 ≈ 200 μmag
f2 = 0.414 c/d	A2 ≈ 16 μmag

f2 ≈ 3f1

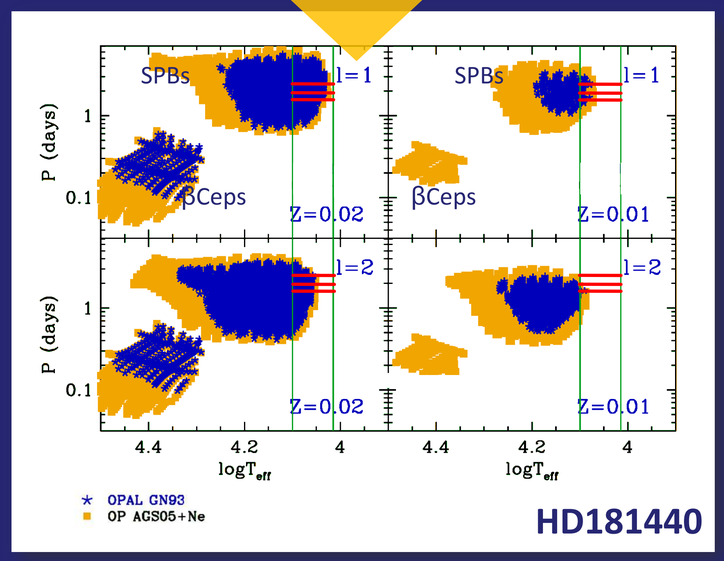
Spectroscopic constraints

T_{eff} = 11450 ± 1150 K
logg = 3.5 ± 0.2
Vsini = 25 ± 1 km/s
Z ≈ 0.012

Comparison with theoretical instability domains



Theoretical SPB instability strips in a T_{eff}-*logg* diagram for two values of the metallicity: Z=0.01 (dark blue lines) and Z=0.02 (light-blue lines) (see Miglio et al 2007 CoAst 151). The 2 stars have similar T_{eff} and logg, lie near the red edge of the IS and near the end of their central H-burning phase.



Theoretical instability domains in a *log*T_{eff}-*Period* diagram. The observed independent frequencies in HD181440 (horizontal red lines) are compatible with SPB-type pulsations predicted in the spectroscopic 1-σ T_{eff} range (vertical green lines).

Summary

- HD181440 and HD182198 are both located near the red edge of the SPB instability strip (SPB-IS), sharing similar spectroscopic properties.
- HD181440 shows low-amplitude multiperiodic variations compatible with SPB-type pulsations.
- The variability detected in HD182198 can be described by a single independent frequency which is compatible with a rotational modulation of the flux.
- The different behaviour of the two targets could be explained by their proximity to the red-edge of the SPB -IS and to the end of the central H-burning phase, which represents as well a limit of the SPB-IS (Pamyatnykh 1999 AcA 49).