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Pulsations in the late-type B supergiant star HD 202850†

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Abstract. HD 202850 is a late B-type supergiant. It is known that photospheric lines of such stars vary. Due to macroturbulence the lines are much wider than expected. Macroturbulence has been linked to stellar pulsations. It has been reported that there are several B supergiants that undergo pulsations. In our previous work, we detected a pulsational period of 1.59 hours in this object from data taken with the Ondřejov 2-m telescope. We continued to investigate this object and we took several time series with the DAO 1.2-m telescope. Our new data suggest that there may be some additional pulsational periods in this star. We present our new results in this poster.

Keywords. stars: supergiants, oscillations, late-type, techniques: spectroscopic, radial velocities

1. Introduction

B supergiants are very important for stellar and galactic evolution, as they enrich their environments with chemically processed material via their line-driven winds. They show strong line profile variability. Their lines are wider than expected from their parameters. The excessive width is due to macroturbulence. Both line profile variability and macroturbulence are indications of stellar pulsations. However, so far only very few such supergiants were investigated to determine their pulsation periods.

2. HD 202850 ($= \sigma$ Cyg)

HD 202850 is a late B-type supergiant star. Its stellar parameters (Markova & Puls 2008) are given in Table 1. It has been classified as B9 Iab, and is located in the OB association Cyg OB 4 at a distance of ≈ 1 kpc. It falls out of any previously calculated instability domains (Saio 2011). In our previous work, we described the 1.59 h pulsation period we detected (see Kraus *et al.* 2012).

3. New preliminary results

In 2012 we took a new set of 294 spectra distributed over 5 nights with the DAO 1.2-m telescope. Exposures were five minutes long, with a signal-to-noise ratio between 150 and 250. The moment analysis showed variability in all three moments, and the first and the third moment seem to vary in phase. Due to high noise, the FFT analysis did not show any pronounced peaks, therefore the period(s) were estimated by fitting a combination

† Based on observations acquired at the Dominion Astrophysical Observatory, Herzberg Institute of Astrophysics, National Research Council of Canada

Table 1. Parameters of HD 202850

$T_{\rm eff}$	$\log L/L_\odot$	$\log g$	R_*	M	$v \sin i$	$v_{\rm macro}$
[K]			$[R_\odot]$	$[M_\odot]$	[km s^{-1}]	[km s^{-1}]
11 000	4.59	1.87	54	8^{+4}_{-3}	33 ± 2	33 ± 2

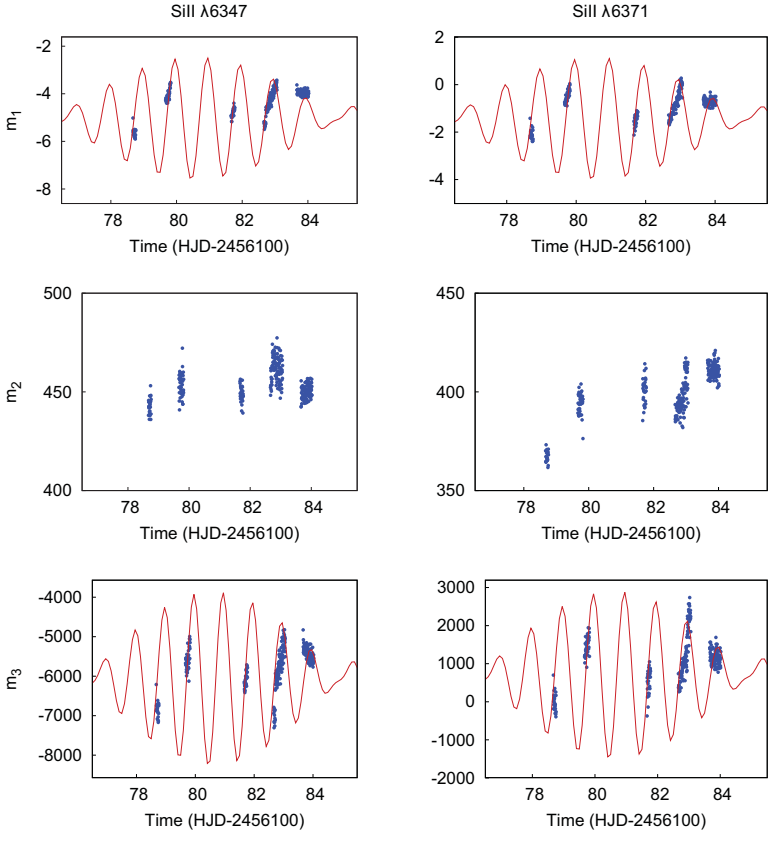

Figure 1. First three small moments. A combination of possible two periods is fit through the first and the third moment.

of sine curves (Fig. 1). We found two new possible periods (a 22.2 h period and a 25.2 h period).

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