



Special Astrophysical
Observatory

EUGENE SEMENKO, SANTOSH JOSHI, ILYA YAKUNIN

CT20. SPECTROSCOPIC VIEW ON THE PULSATING STARS HD 73045 AND HD 118660

HISTORICAL INTRODUCTION

- ▶ A «magnetic» conference at SAO (Russia) in 2010
- ▶ Cape-Nainital photometric survey and «probably» roAp-stars
- ▶ HD 207561, a roAp-star that doesn't pulsate. [2012MNRAS.424.2002J](#)
- ▶ Seven more A-stars with detailed analysis of a chemical composition: HD 13038, HD 13079, HD 25515, HD 98851, HD 102480, HD 113878, HD 118660. [2017MNRAS.467..633J](#)
- ▶ The main goal is a determination of basic atmospheric parameters and chemical composition from high-resolution spectroscopy

«SPECTROSCOPIC VIEW ON THE PULSATING STARS HD 73045 AND HD 118660» BY EUGENE SEMENKO

OBSERVATIONAL SUPPORT

- ▶ programme nights
- ▶ Director's reserve
- ▶ technical time

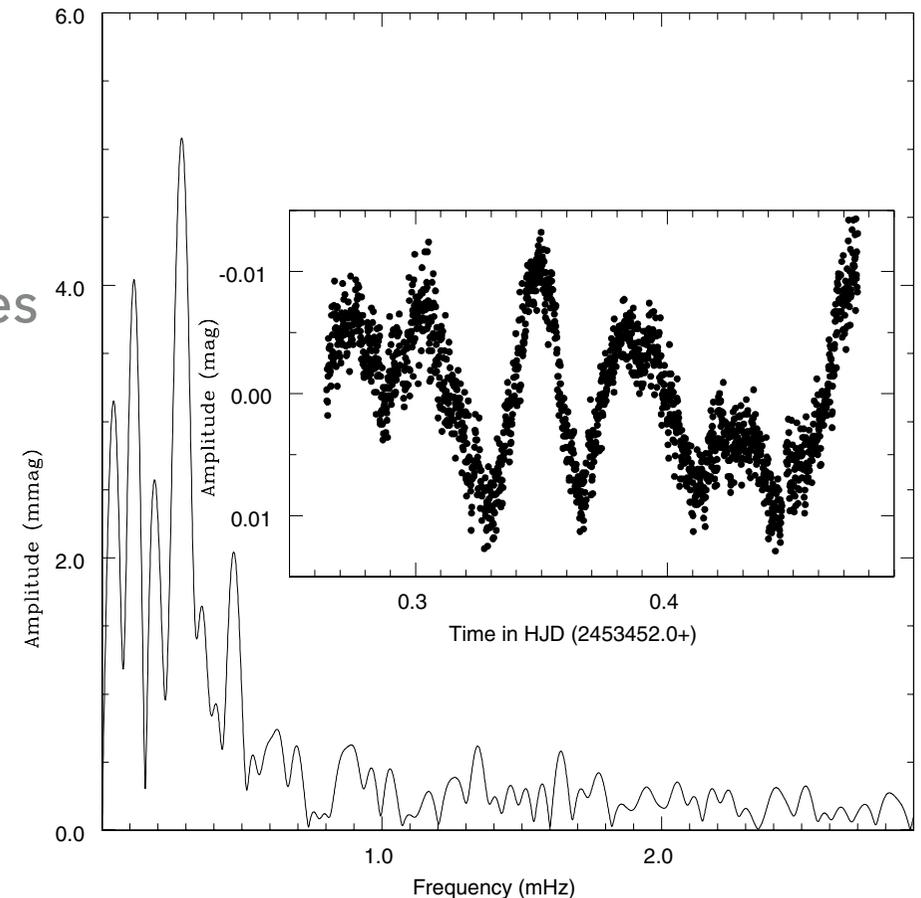
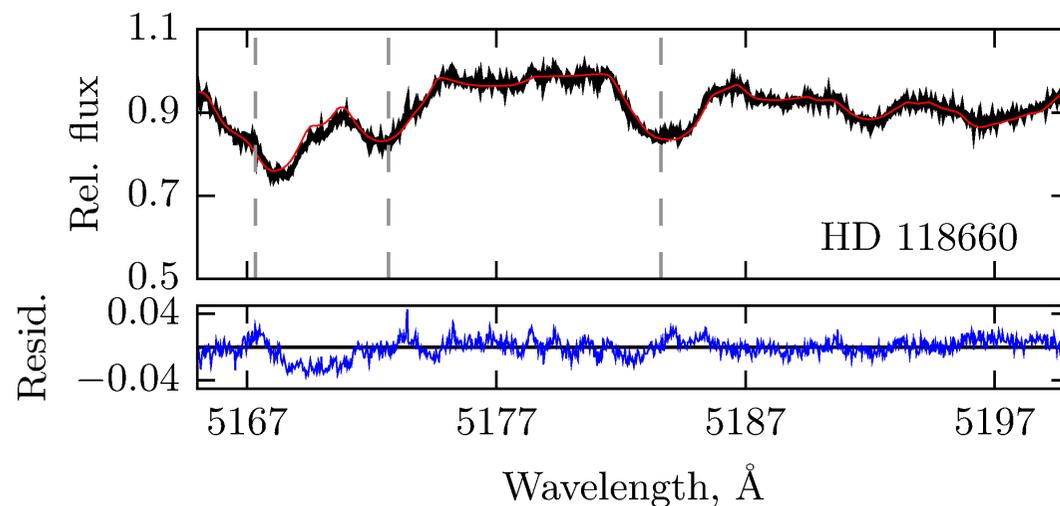
- ▶ BTA (6 m, F/4), 41°E 43°N
- ▶ NES, Nasmyth Echelle Spectrograph, 400-700 nm, R=40,000
- ▶ MSS, Main Stellar Spectrograph, 500/850 nm long, R=15,000, spectropolarimetry

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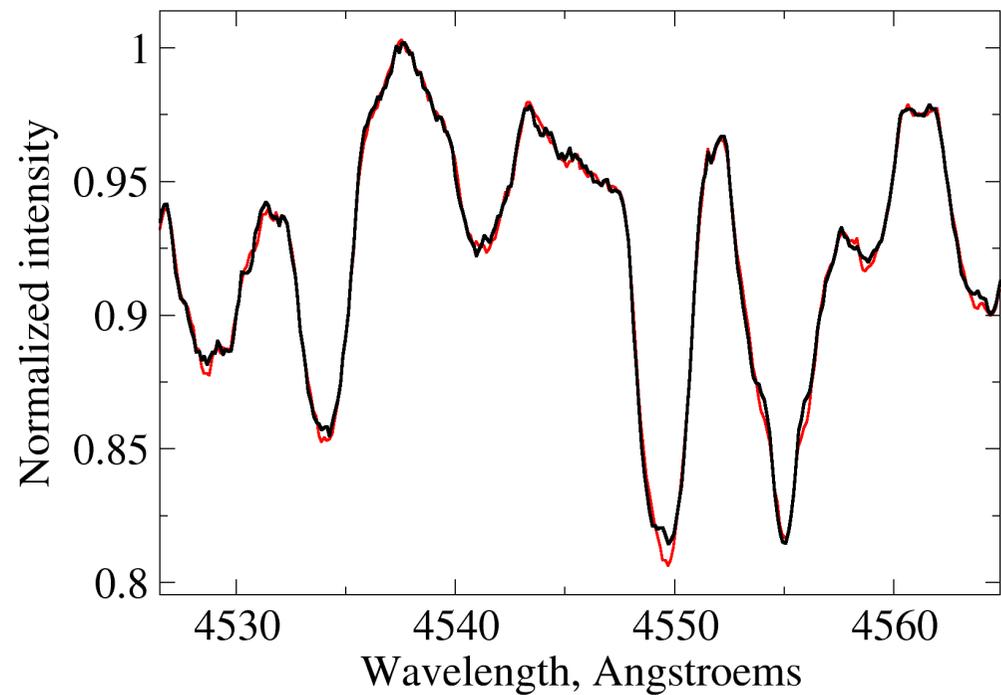
HD 118660

- ▶ Bright (6.3 mag) multiperiodic pulsating variable
- ▶ $T_{\text{eff}} = 7550 \text{ K}$, $\log g = 4.0$
- ▶ $v \sin i = 108 \text{ km/s}$
- ▶ Mild Am-type anomalies in abundances



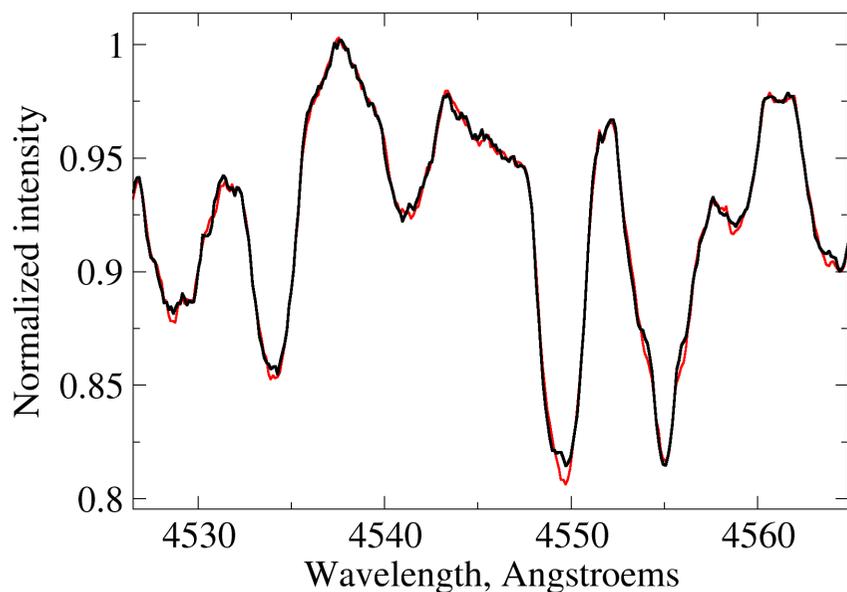
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- ▶ 40-frame's series (20/03/2016)

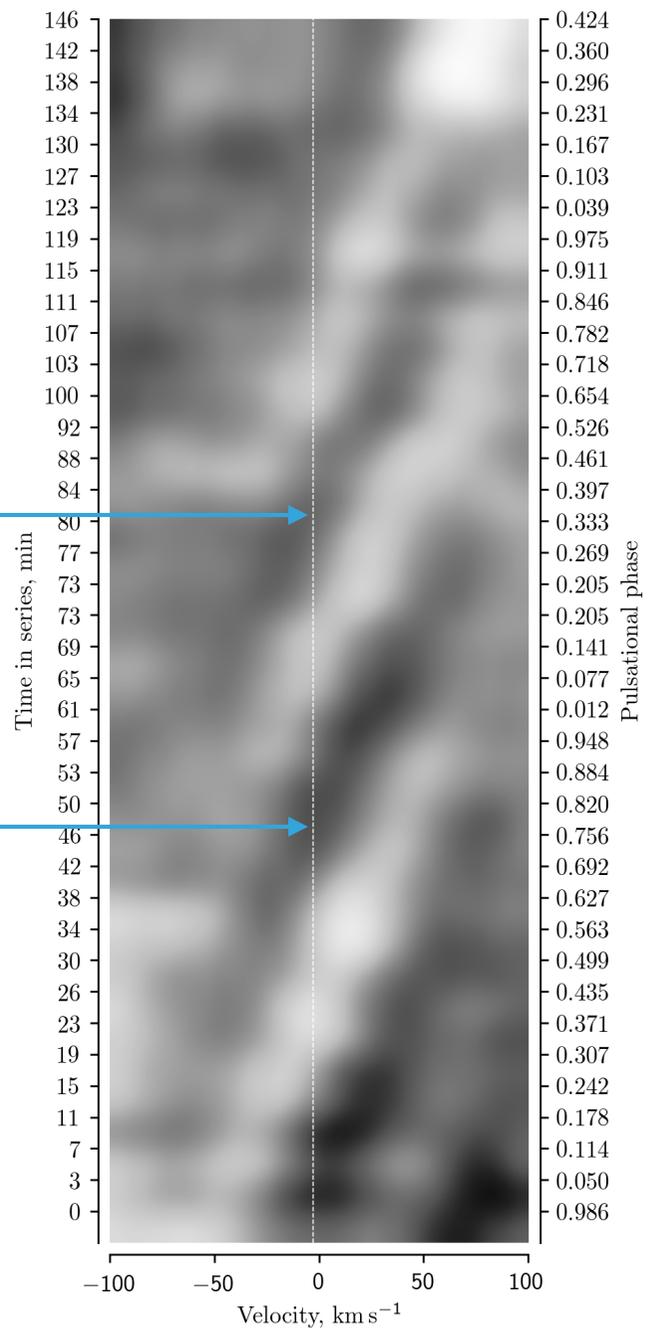


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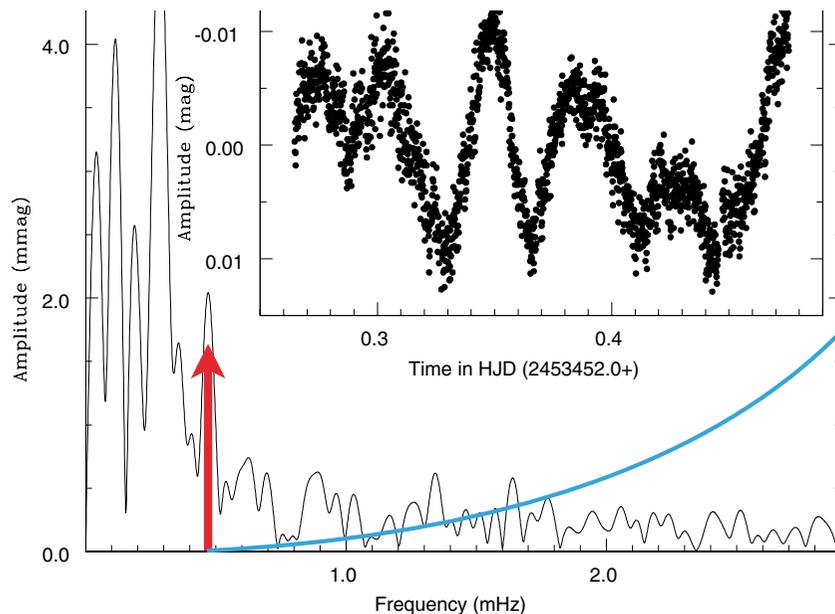


$P \approx 35\text{-}40 \text{ min}$

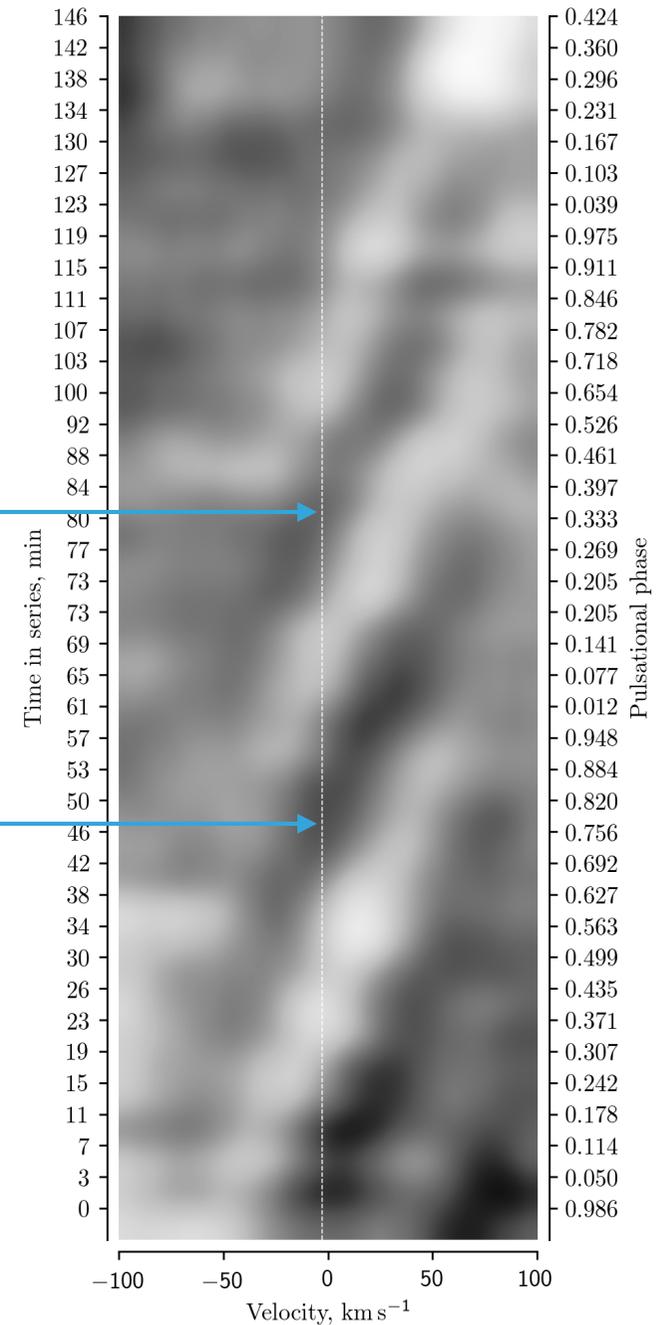


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HD 73045

- ▶ A 8.62 mag (*V*) Praesepe member
- ▶ Spectroscopic binary, $P = 435$ days, $e = 0.32$. [2007MNRAS.380.1064C](#)
- ▶ Am-type non-magnetic star: $T_{\text{eff}} = 7570$ K, $\log g = 4.0$, $v \sin i = 10$ km/s. [2007A&A...476..911F](#)
- ▶ Photometry at STEREO: $P = 1.25$ days, possible blending. [2013MNRAS.429..119P](#)
- ▶ Kepler K2 mission: $P = 13.01$ days ([2017ApJ...839...92R](#)) and $P = 12.83$ days ([2017ApJ...842...83D](#)) – axial rotation?
- ▶ and many more periods...

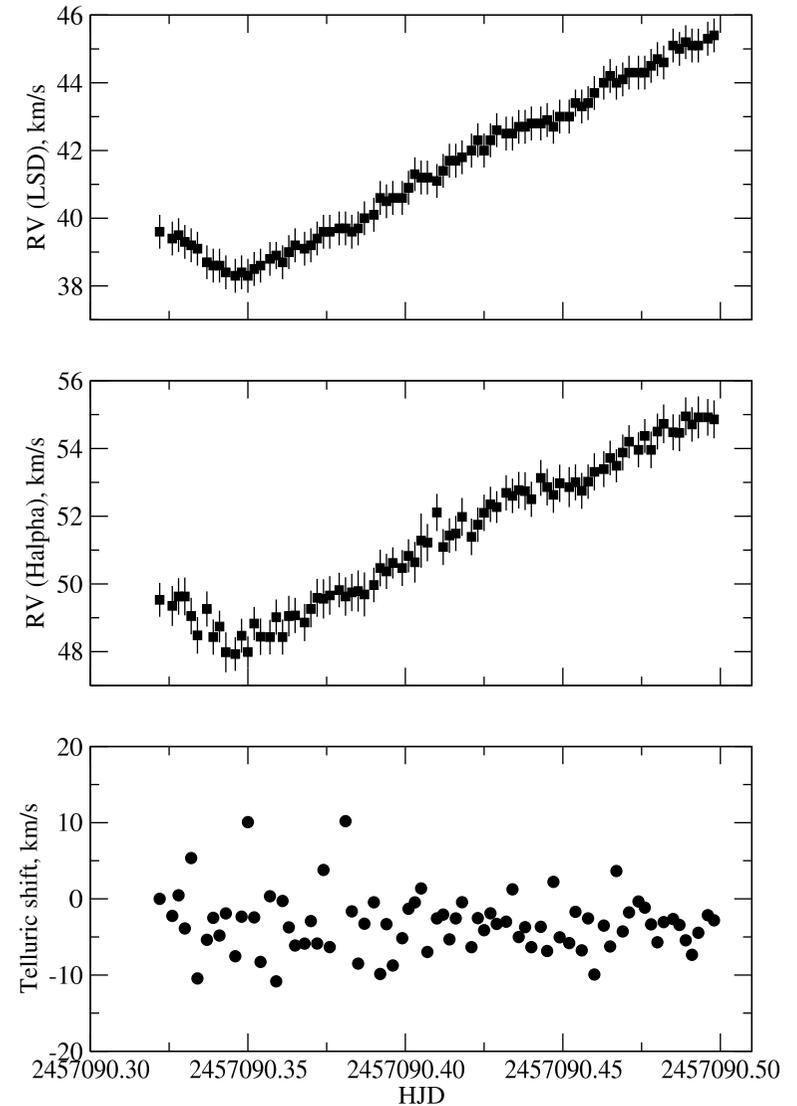
HD 73045. PHOTOMETRY

Summary by Santosh Joshi:

- ▶ Photoelectric Photometry :
 - ✓ $P = 50$ min, 90 min (SAAO) → pulsation?
 - ✓ $P = 40$ min (ARIES) → pulsation?
- ▶ Ground based Differential CCD Photometry
 - ✓ $P = 2$ hrs (ARIES, 1.3-m DFOT) → ?
 - ✓ $P = 4$ hrs (MASTER-II-URAL) → ?
- ▶ Space Photometry
 - ✓ $P = 1.25$ -days (STEREO, Paunzen et al. (2013) → rotation?
 - ✓ $P = 13.01$ -days (Kepler, Rebull et al. (2016) → rotation?

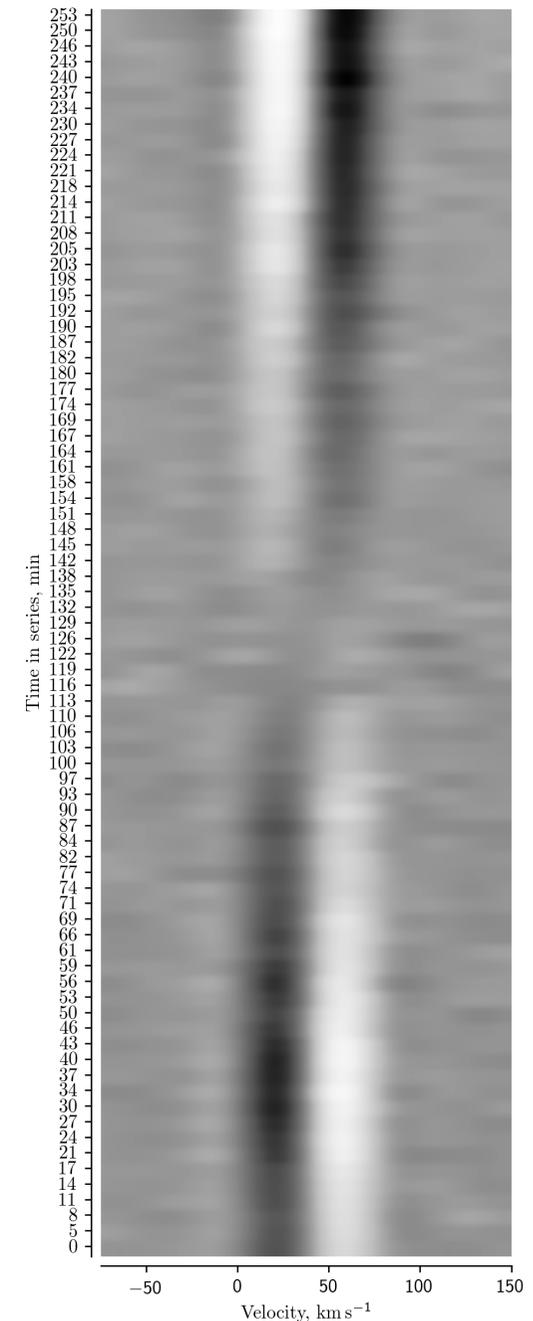
HD 73045. SPECTROSCOPY

- ▶ BTA. Several observations, one series.
RV drift ($P \approx 4$ hrs) caused by
instrumental instabilities



HD 73045. SPECTROSCOPY

- ▶ MSS@BTA. Several observations, one series.
RV drift ($P \approx 4$ hrs) caused by instrumental instabilities



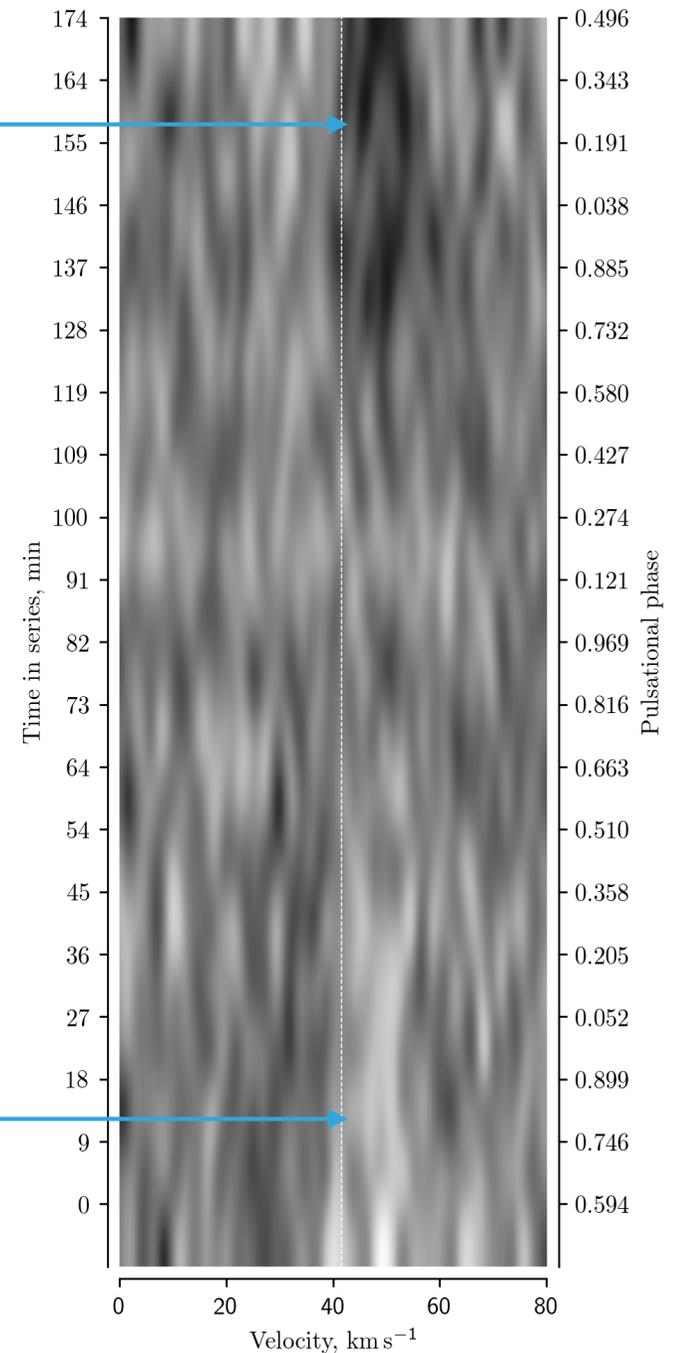
HD 73045. SPECTROSCOPY

- ▶ MSS@BTA. Several observations, one series.
RV drift ($P \approx 4$ hrs) caused mostly by instrumental instabilities
- ▶ HERMES. Several sets (?)
Subrange 440 - 495 nm
General mask for a A8p-type star
⇒ The same period $P \approx 4$ hrs?

If $P_{\text{rot}} = 13$ days: $R \geq 2.5 R_{\odot}$ (evolved star?)

- ▶ A lot to do in the future

$P/2 \approx 145$ min





Thank you for your attention!

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