

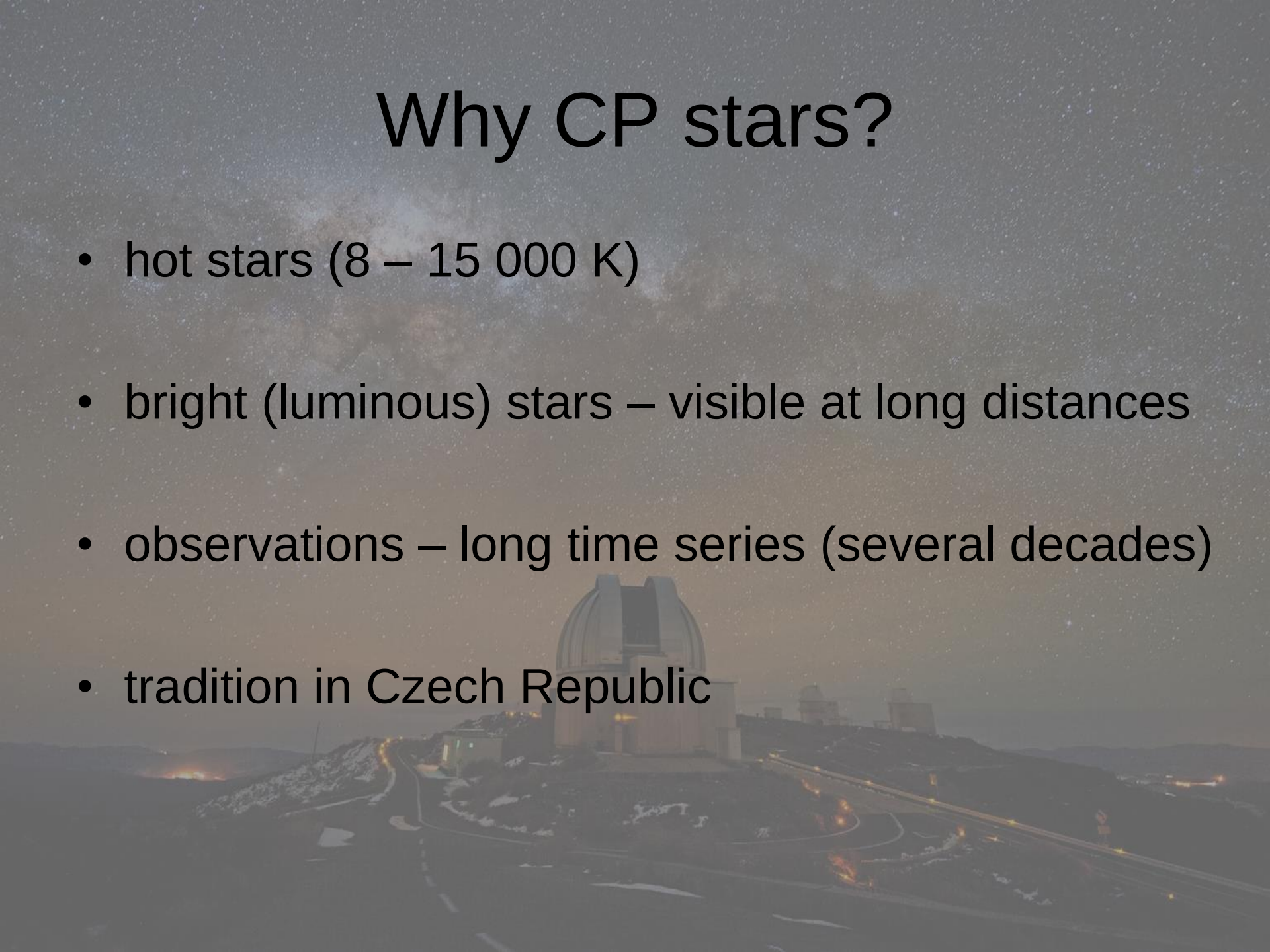
A night photograph of the La Silla Observatory dome, a large, metallic, dome-shaped structure, illuminated from below. The dome is situated on a dark, rocky hillside. In the background, the Milky Way galaxy is visible as a bright, cloudy band of stars stretching across the dark sky. Other smaller observatory domes are visible in the distance. The foreground shows a road with some lights and a small building.

CP stars at La Silla

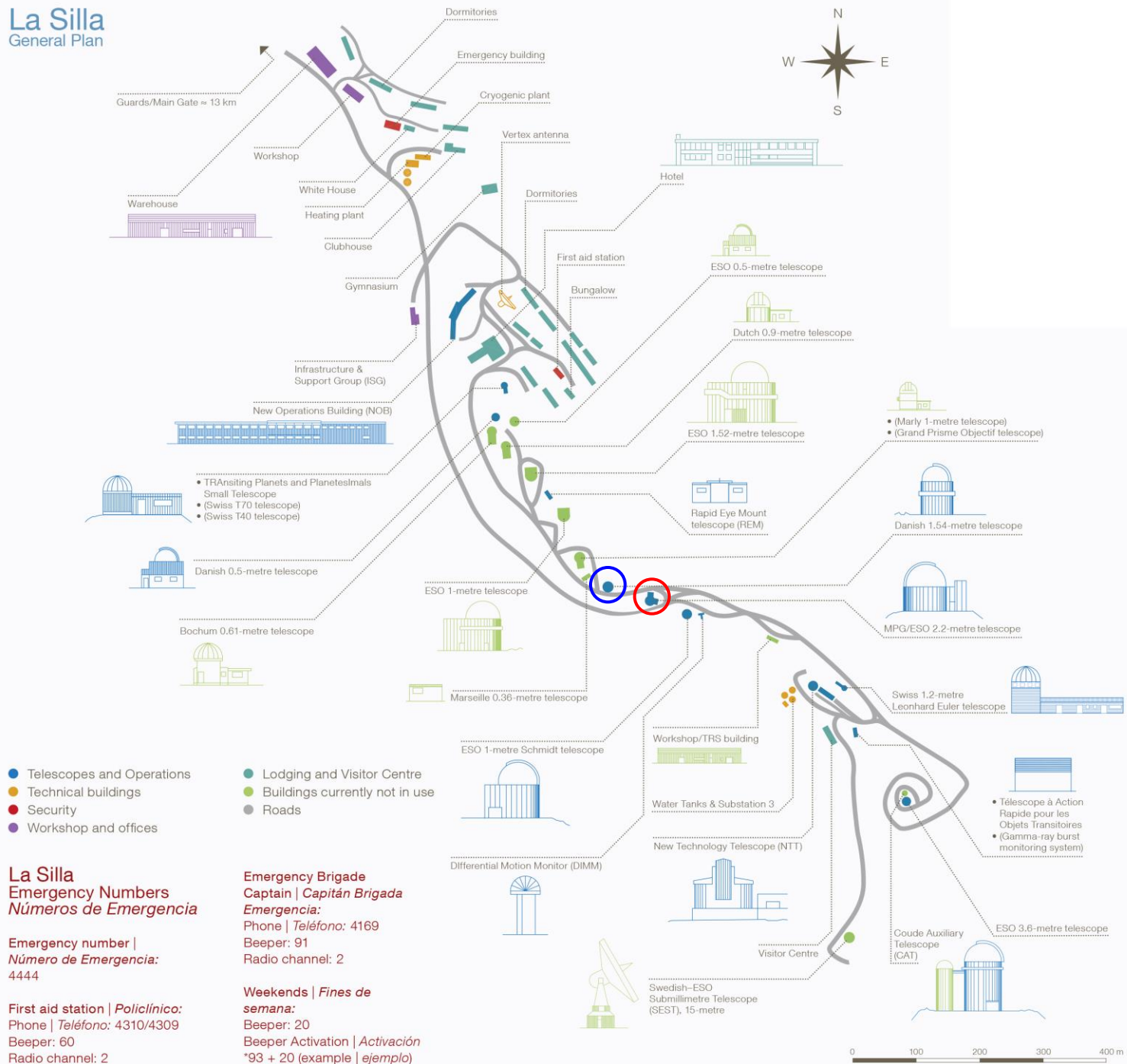
Jan Janík, Masaryk University Brno
7 years in Chile, 15.4.2014

Why CP stars?

- hot stars (8 – 15 000 K)
- bright (luminous) stars – visible at long distances
- observations – long time series (several decades)
- tradition in Czech Republic



La Silla General Plan



Why FEROS?

- historically and also own current photometric measurements of CP stars (photographic, photoelectric, CCD)
- on-line database mCPod (also 7 years old ☺)
 - 167 stars
 - 230 238 individual measurements
 - <http://astro.physics.muni.cz/mcpod/>
- combination photometry and spectroscopy – more information

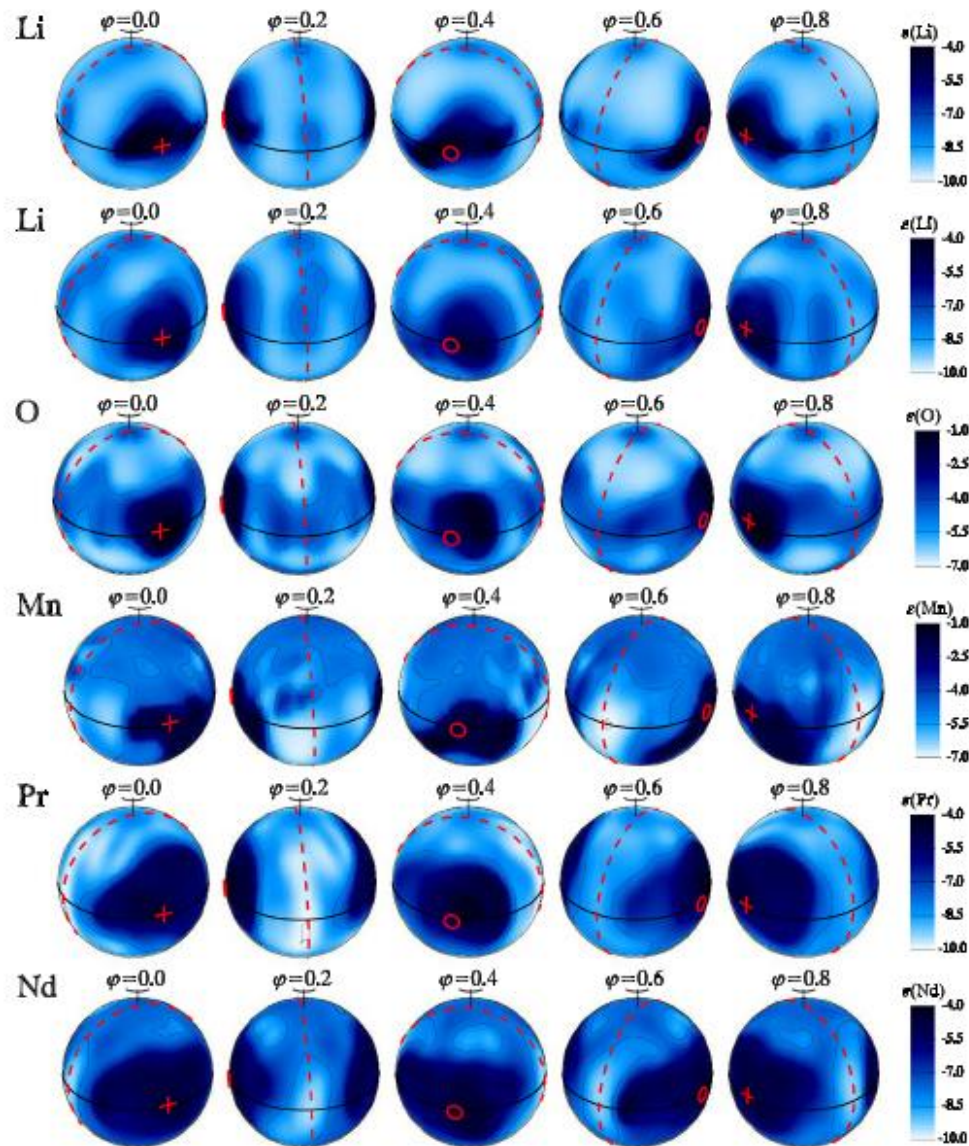
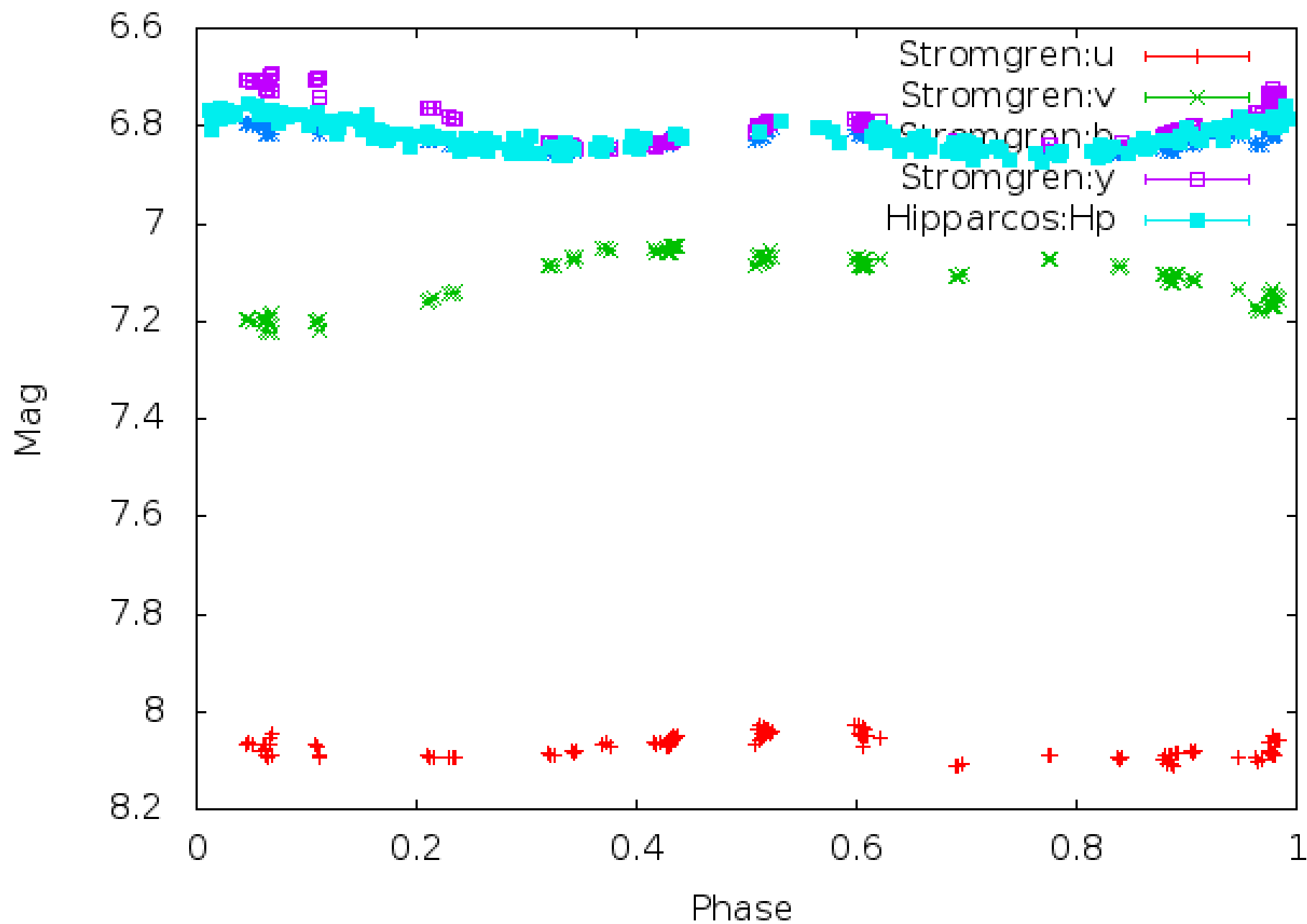
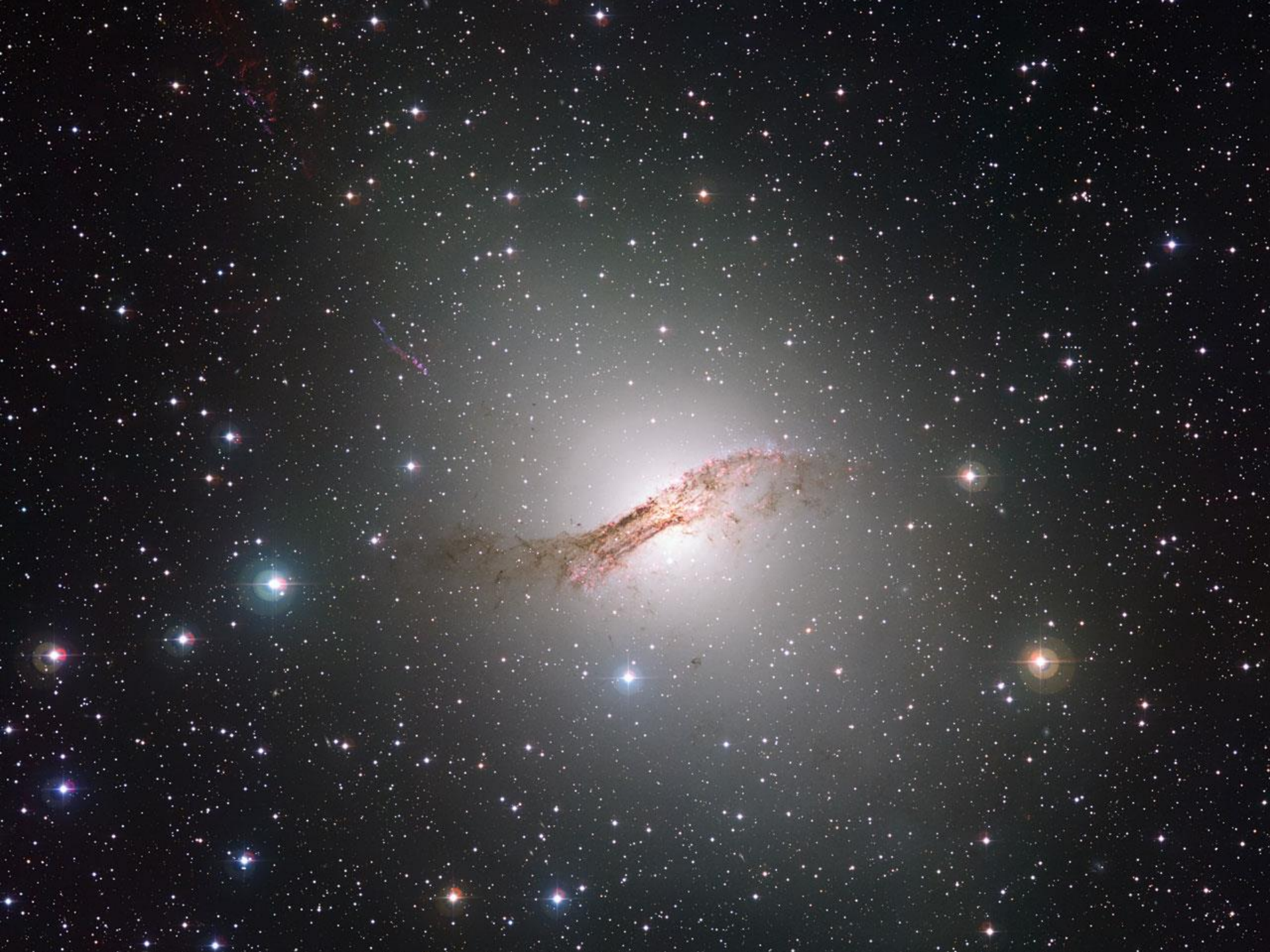
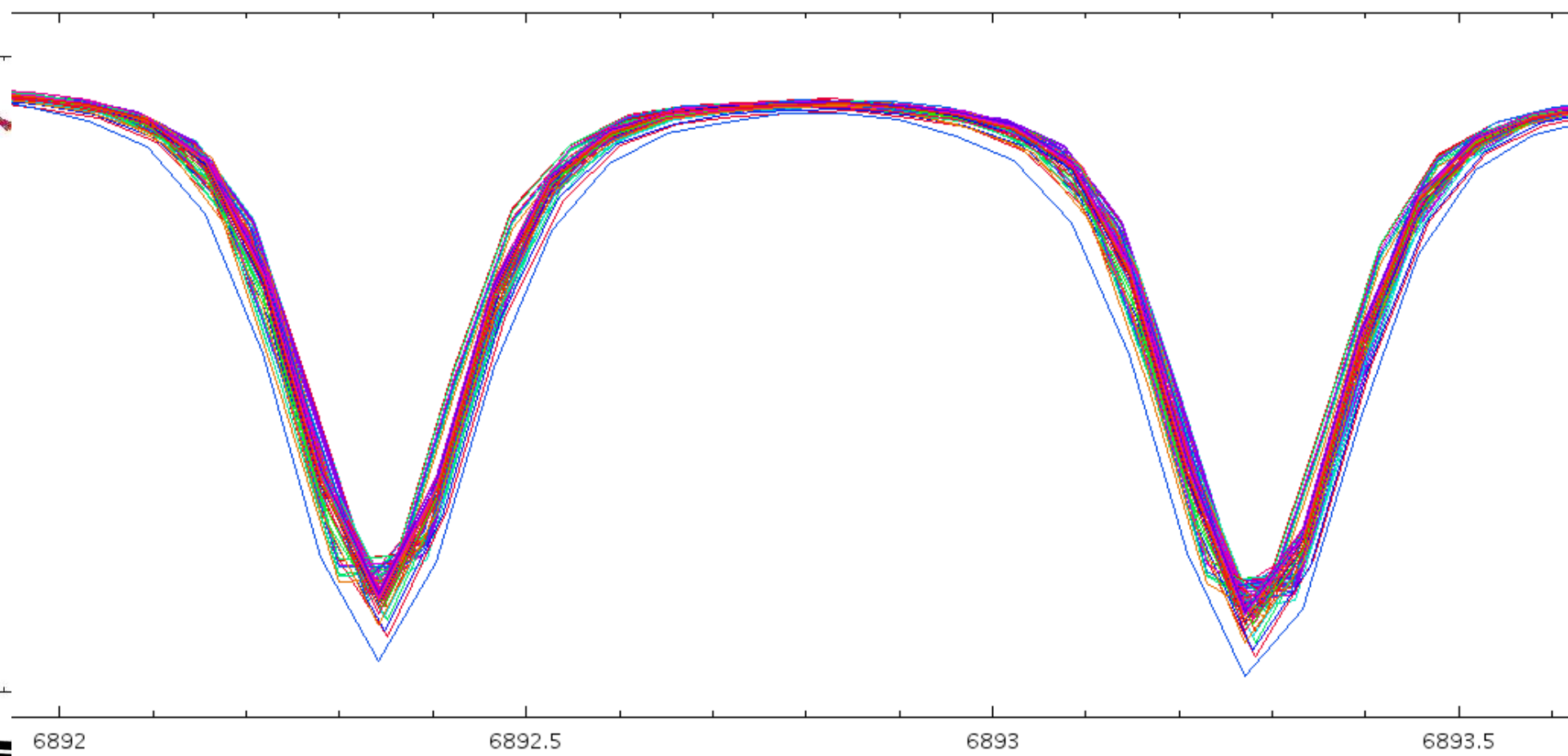


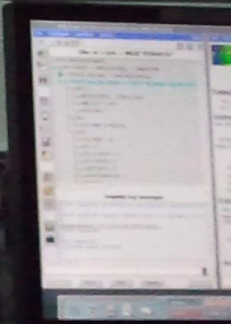
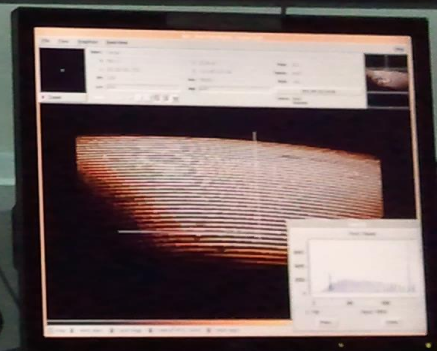
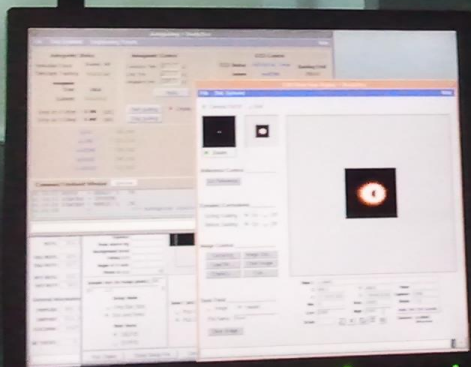
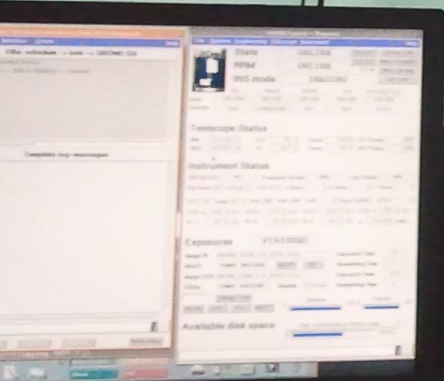
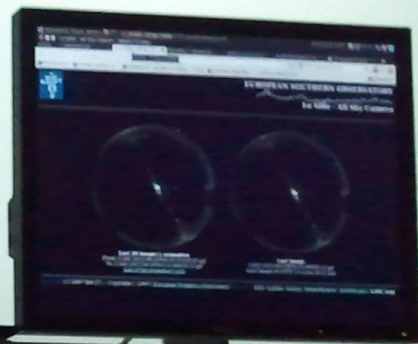
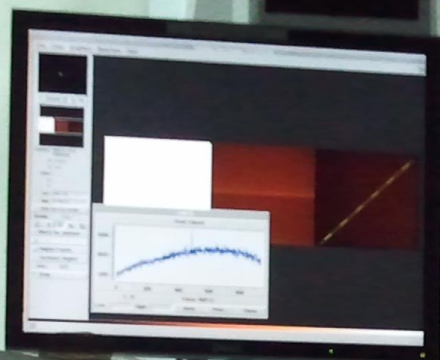
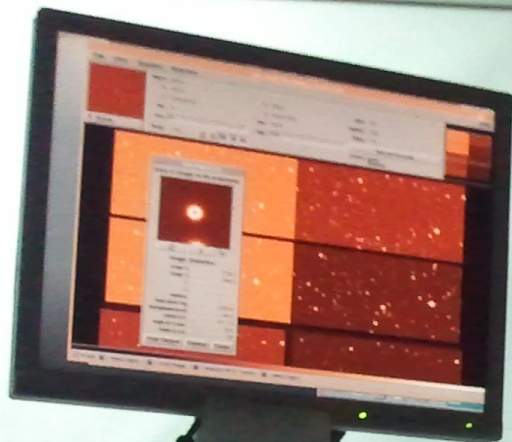
Fig. 4. Abundance distributions of Li, O, Mn, Pr, and Nd at the surface of HD 3980 obtained from the lines listed in Table 2. The star is shown at five rotational phases. Darker areas correspond to the higher elemental abundances, the corresponding scale is given to the right of each panel and contours with equal abundances are plotted with steps of 1 dex. The circle and the cross indicate the position of the negative and the positive magnetic poles, respectively. This figure represents elements of *Group I* with enhanced spots centered on the magnetic poles. Two Li maps correspond (from top to bottom) to the cases of simultaneous mapping of Li I and Pr III blend at 6707 Å, and additional implementation of Pr III 7781.983 Å line (see text). Abundances are given in $\log(N_{\text{el}}/N_{\text{total}})$.

mCPod phased lightcurve of star HD 125630











Year 2011

- **Proposal ID - 087.C-0476(A)**

31. July - 7. August 2011 – 5 nights



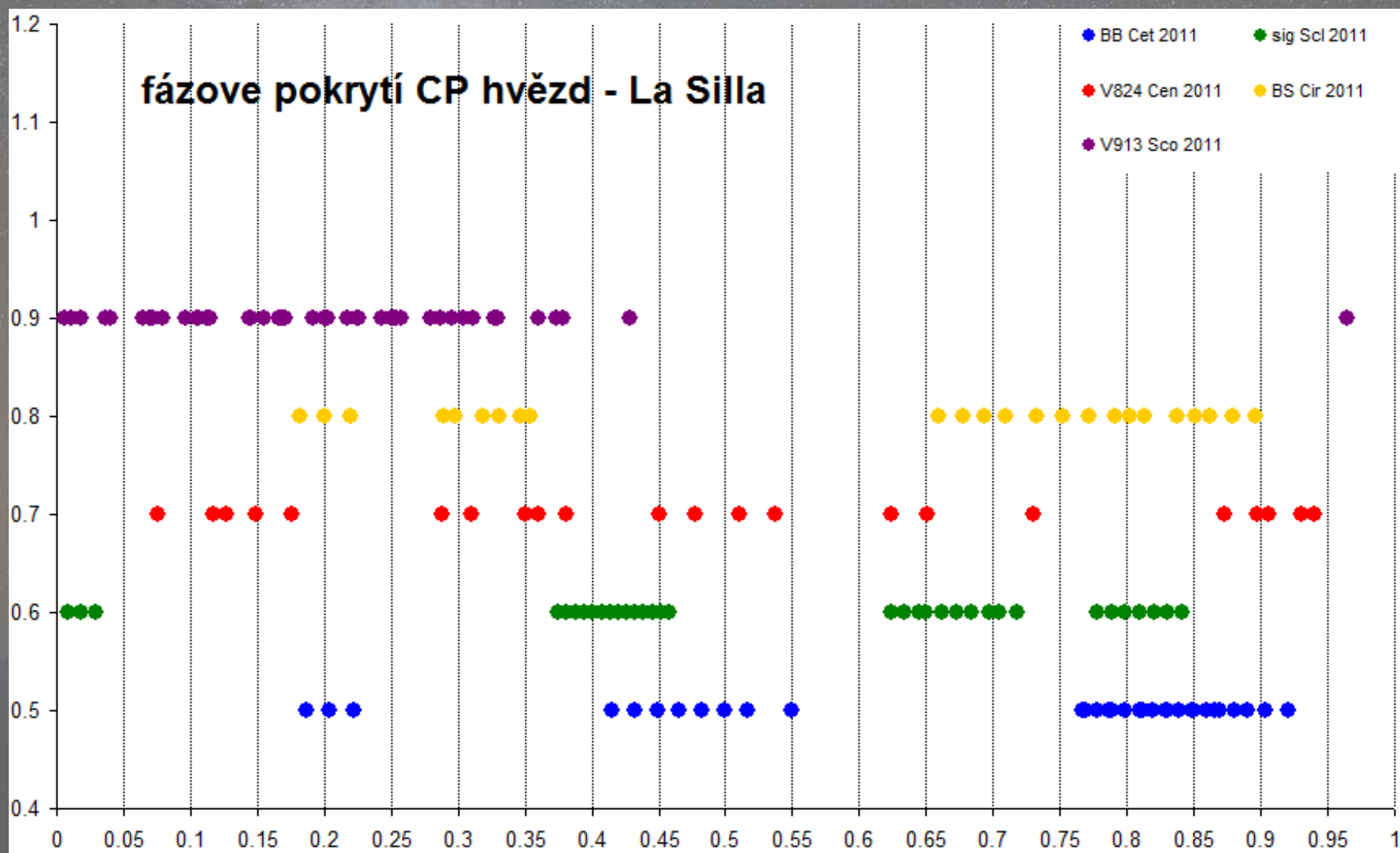




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PHASE COVERAGE 2011



Year 2012

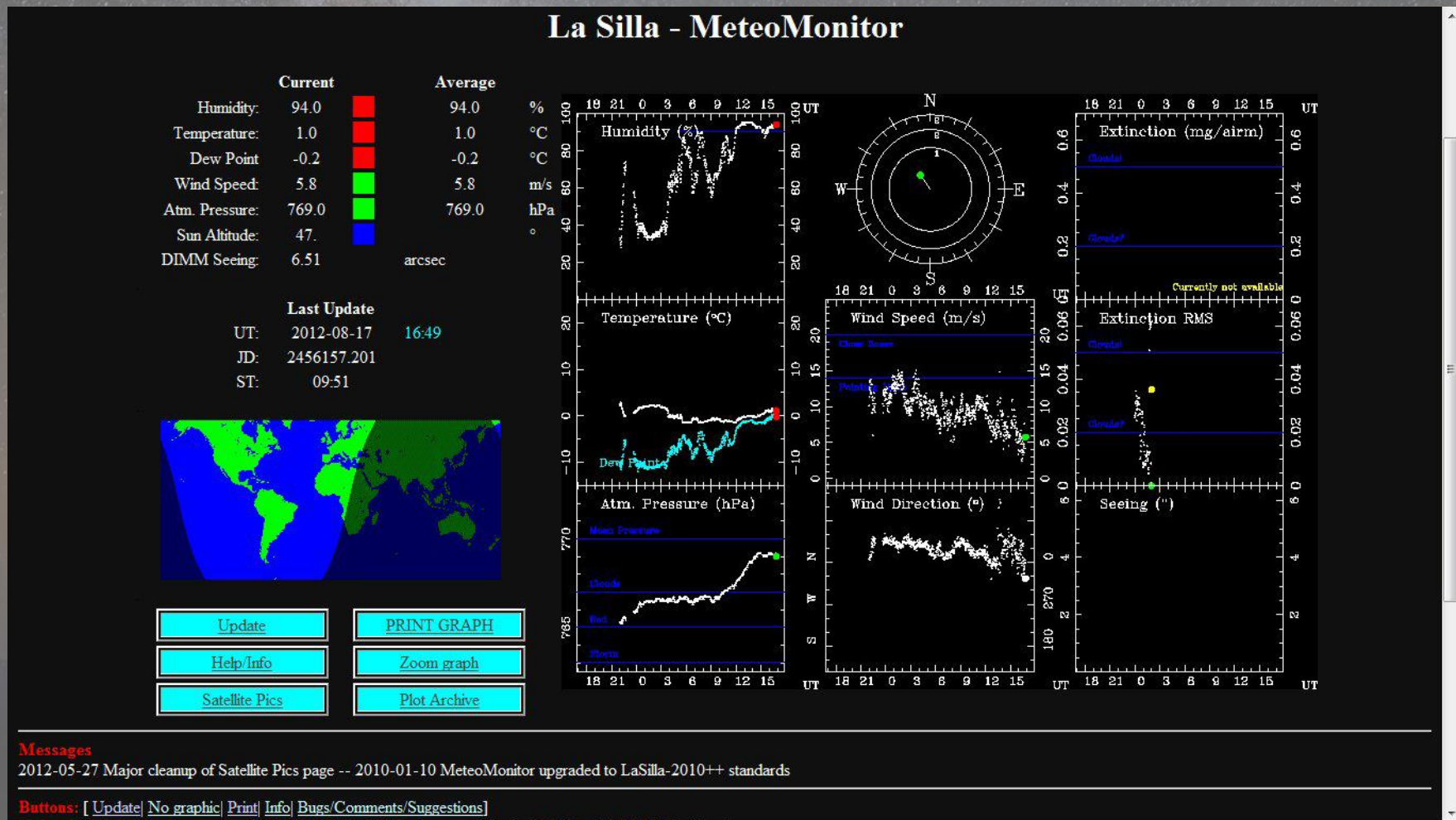
- **Proposal ID - 089.D-0153(A)**

13. - 20. August 2012 – only 3.5 nights





... at La Silla could be
bad weather ...

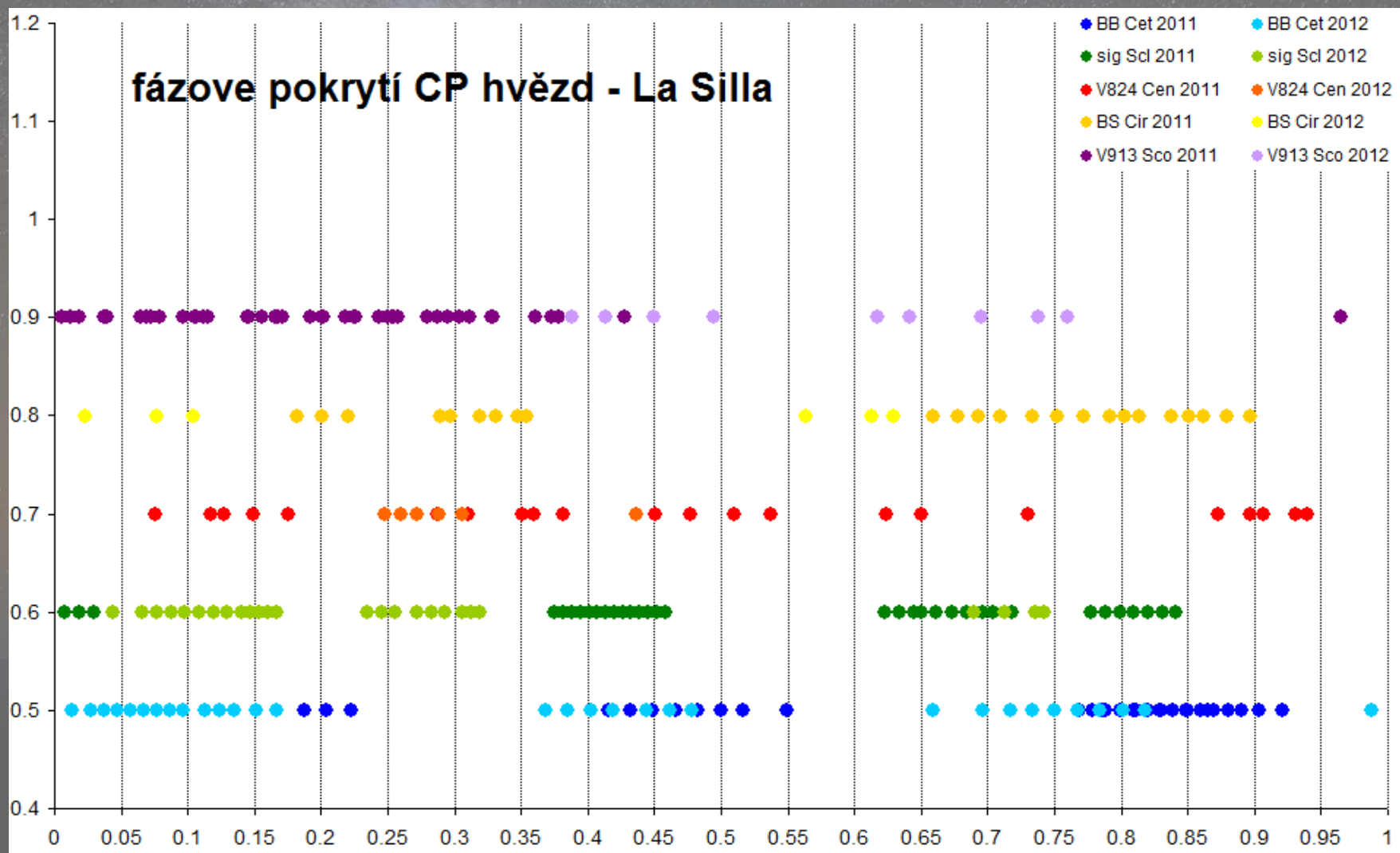




Candidates – targets of opportunity

- V824 Cen ($P=1.272^d$, $V=6.035$ mag)
- BS Cir ($P=2.204^d$, $V=6.76$ mag)
- V913 Sco ($P=0.492^d$, $V=5.43$ mag)
- BB Cet ($P=1.479^d$, $V=6.713$ mag)
- σ Scl ($P=2.368^d$, $V=5.509$ mag)
- in year 2012 HD 64740 and binary stars V1010 Oph + FO Vir

PHASE COVERAGE 2012



SPECTRA

- V824 Cen (22+6) 230 minuts

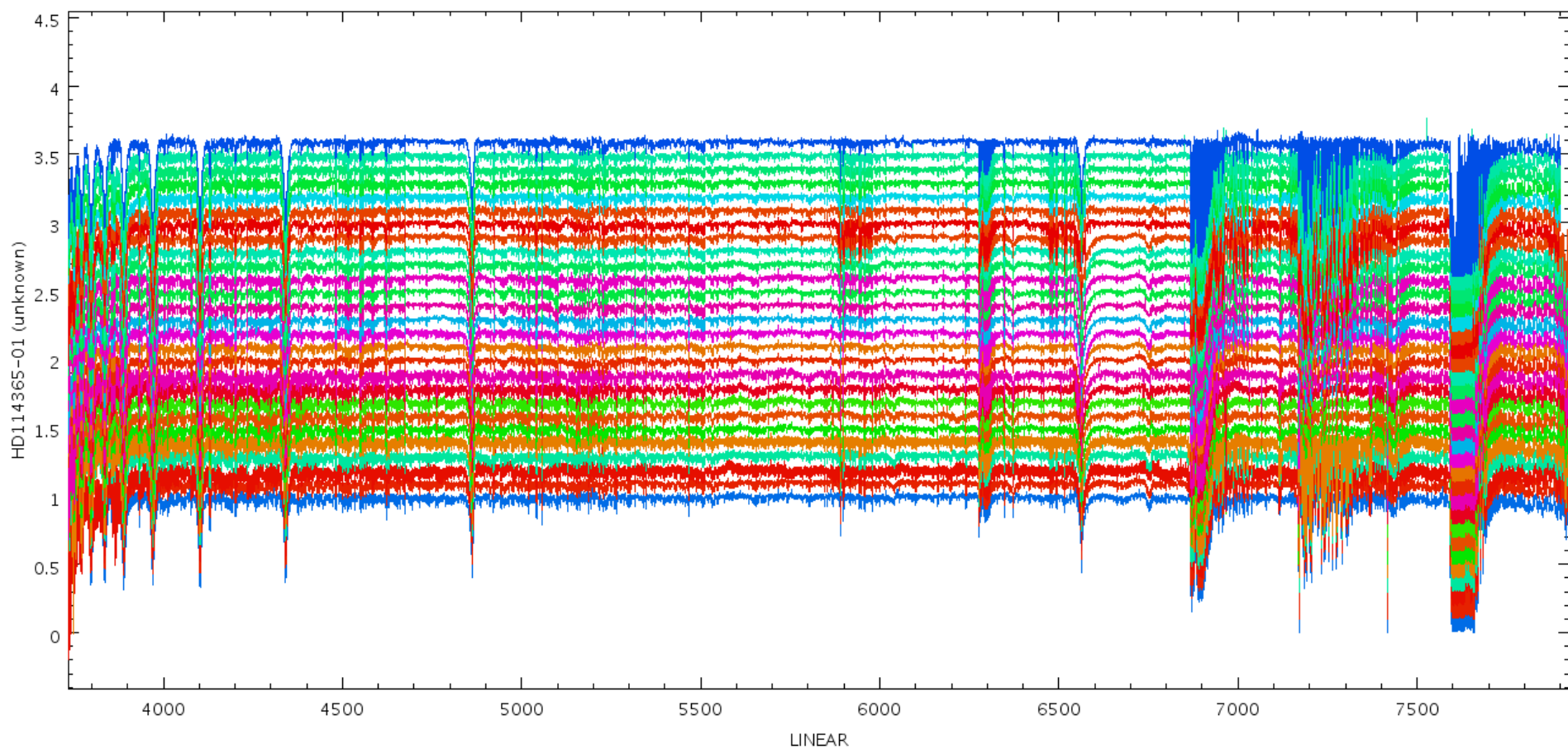
TOGETHER 270 SPECTRA

**about 2800 minuts = 46.73 hours of
observing time**

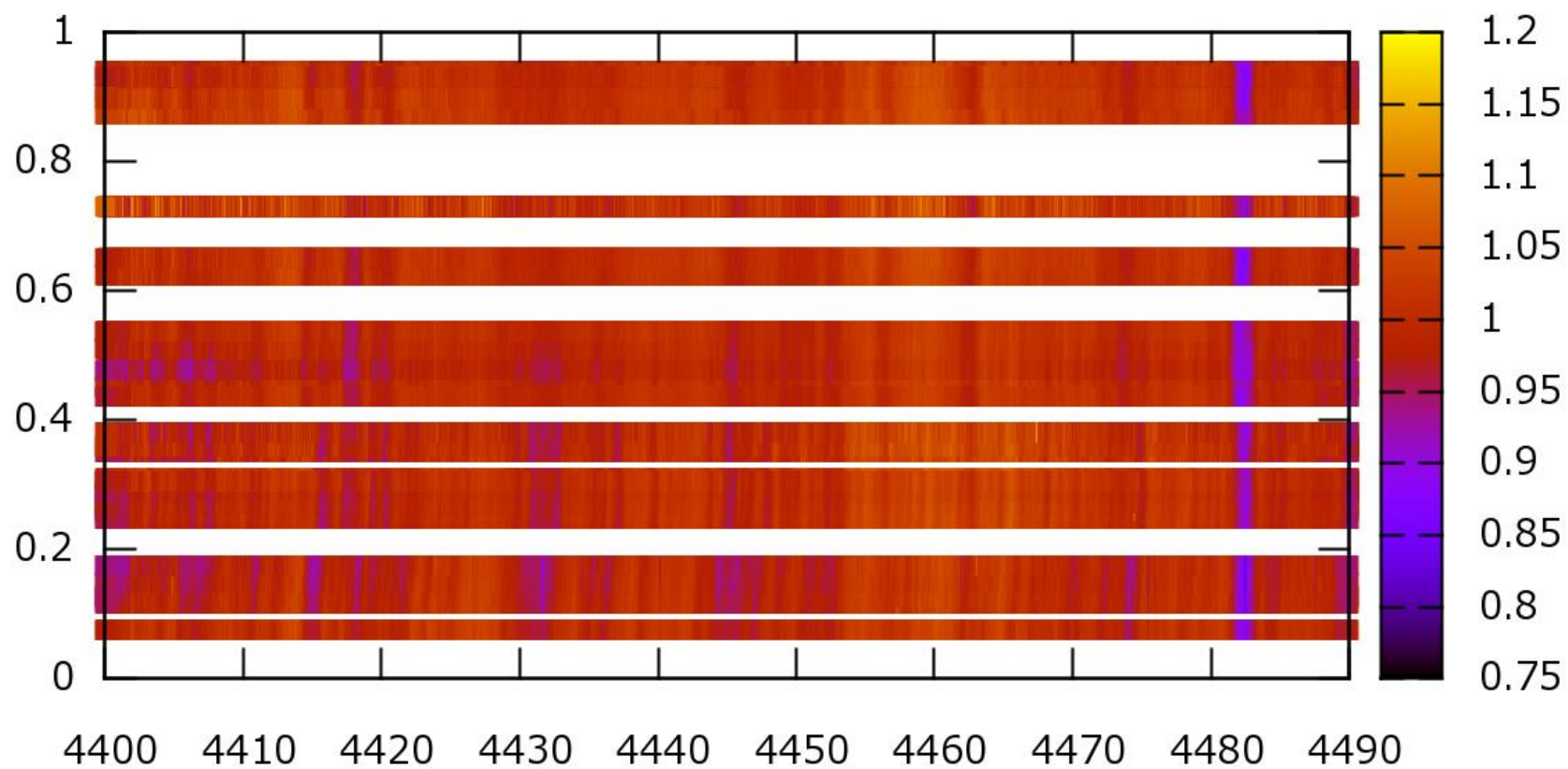
- FO Vir (9) 18 minuts

V824 Cen

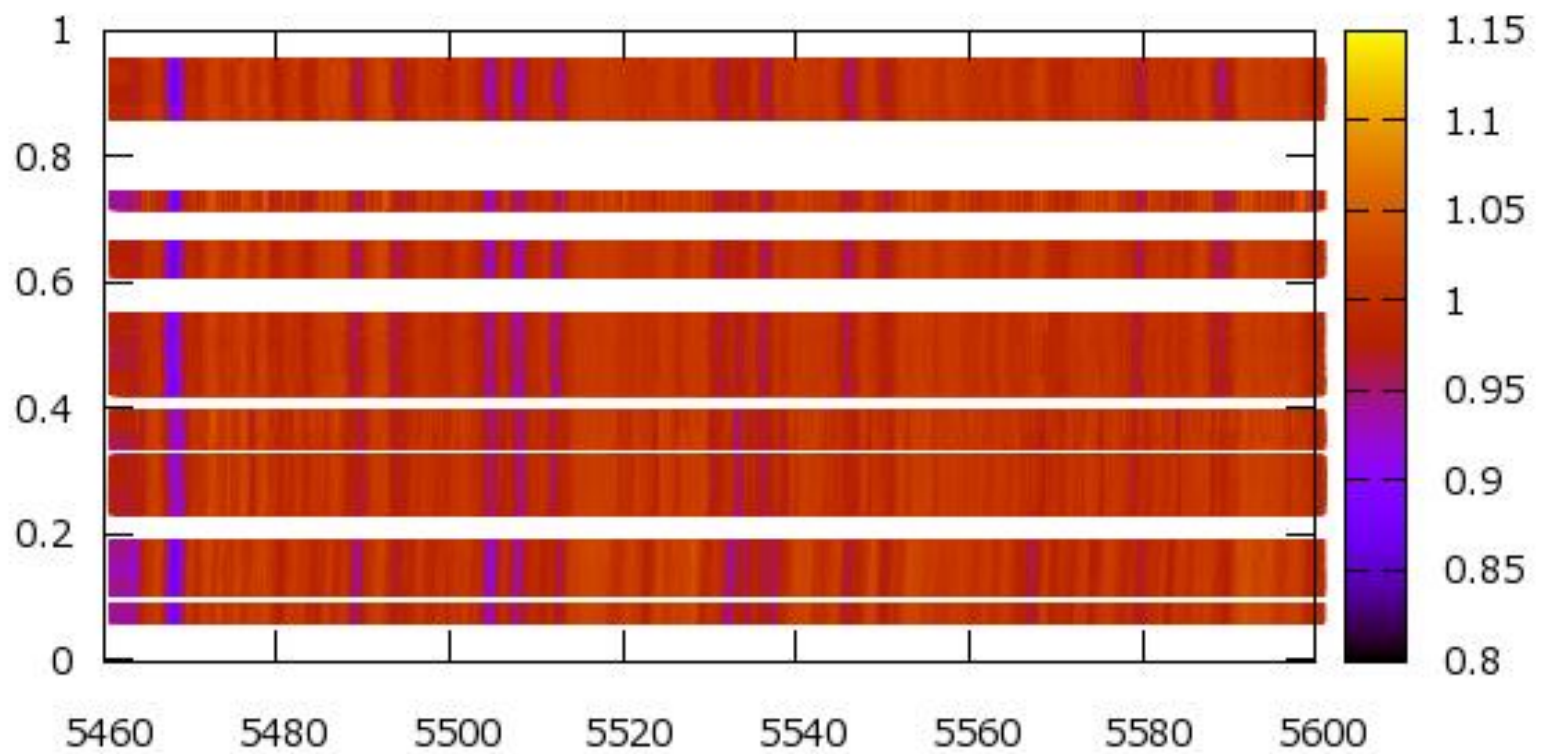
2-d compound coordinate system



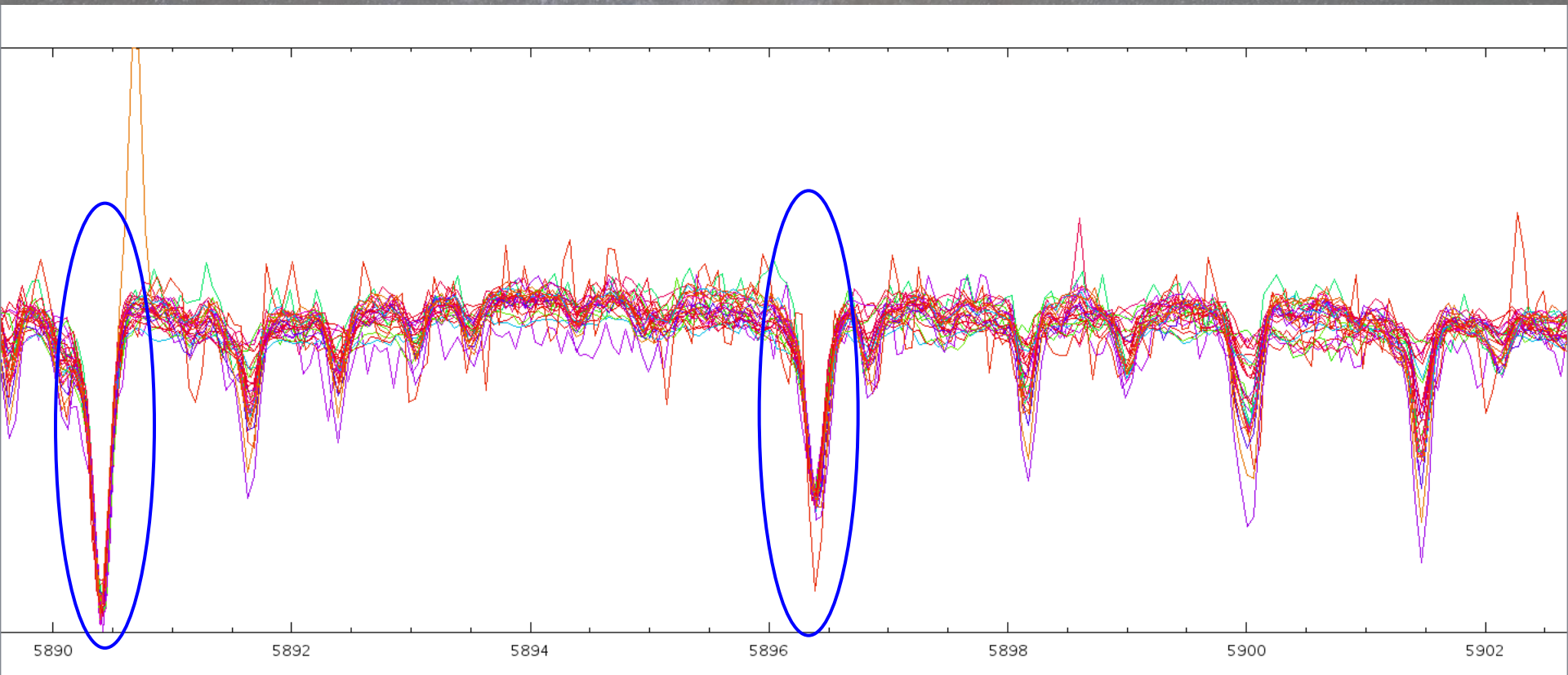
V824 Cen

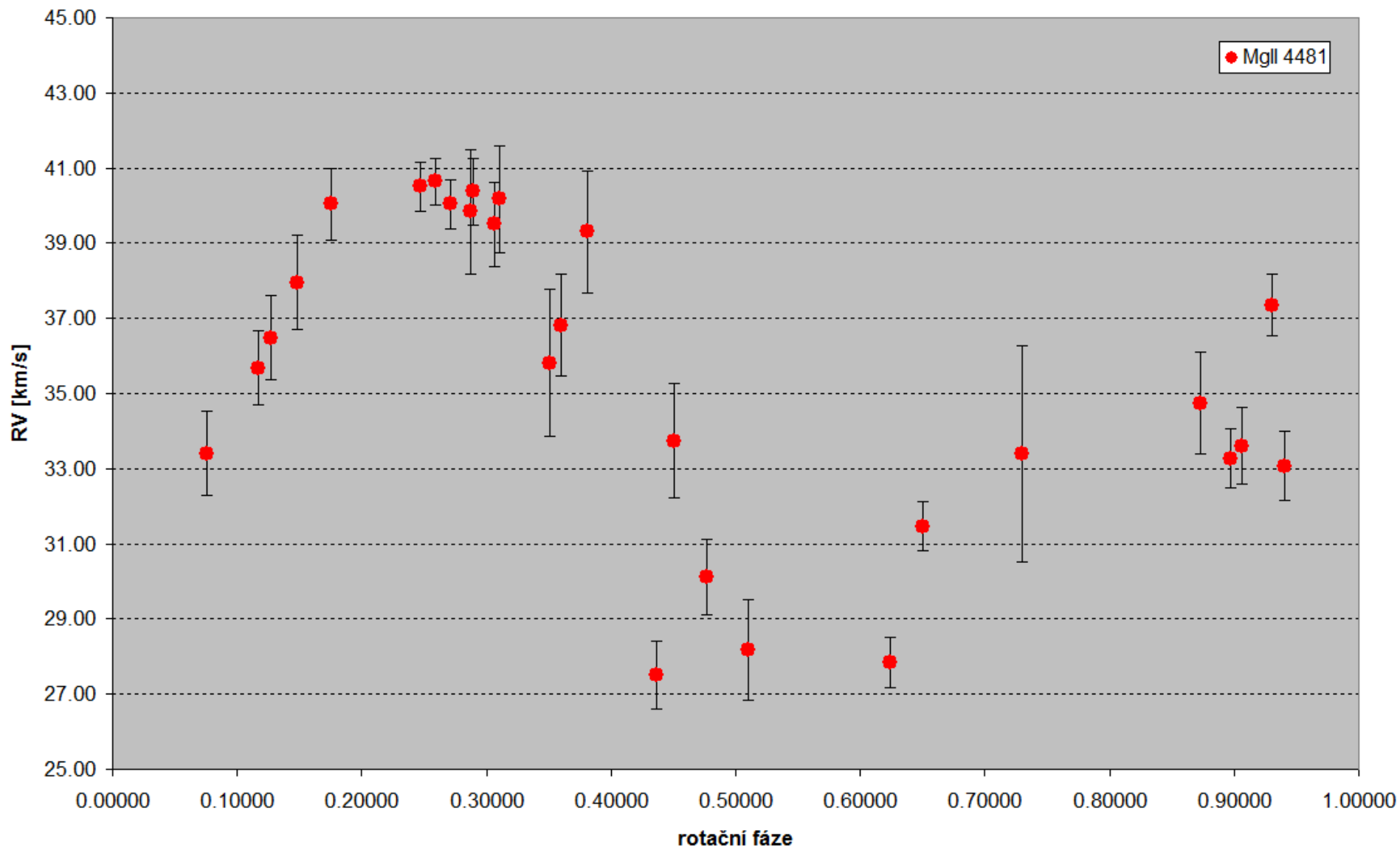


V824 Cen

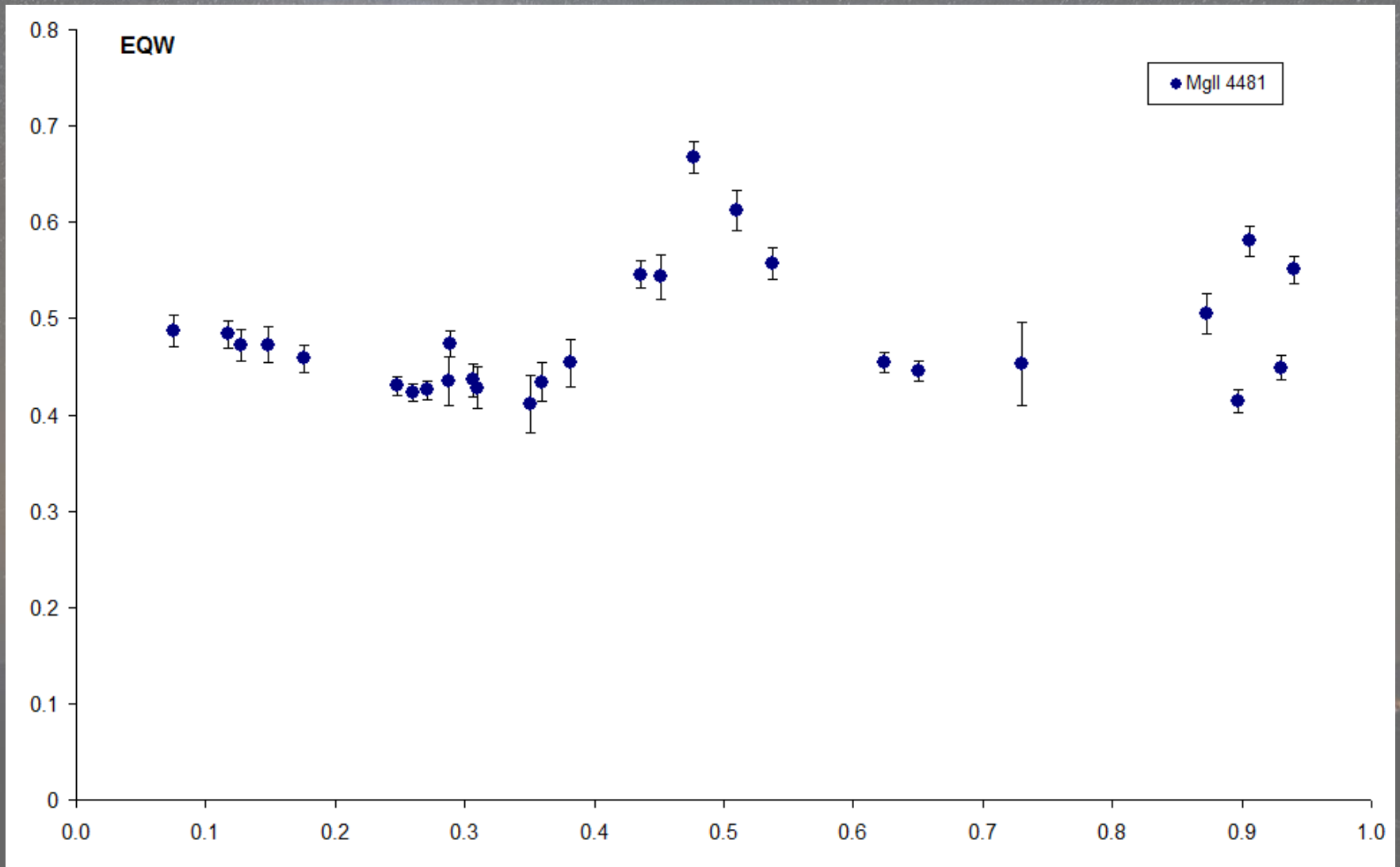


V824 Cen

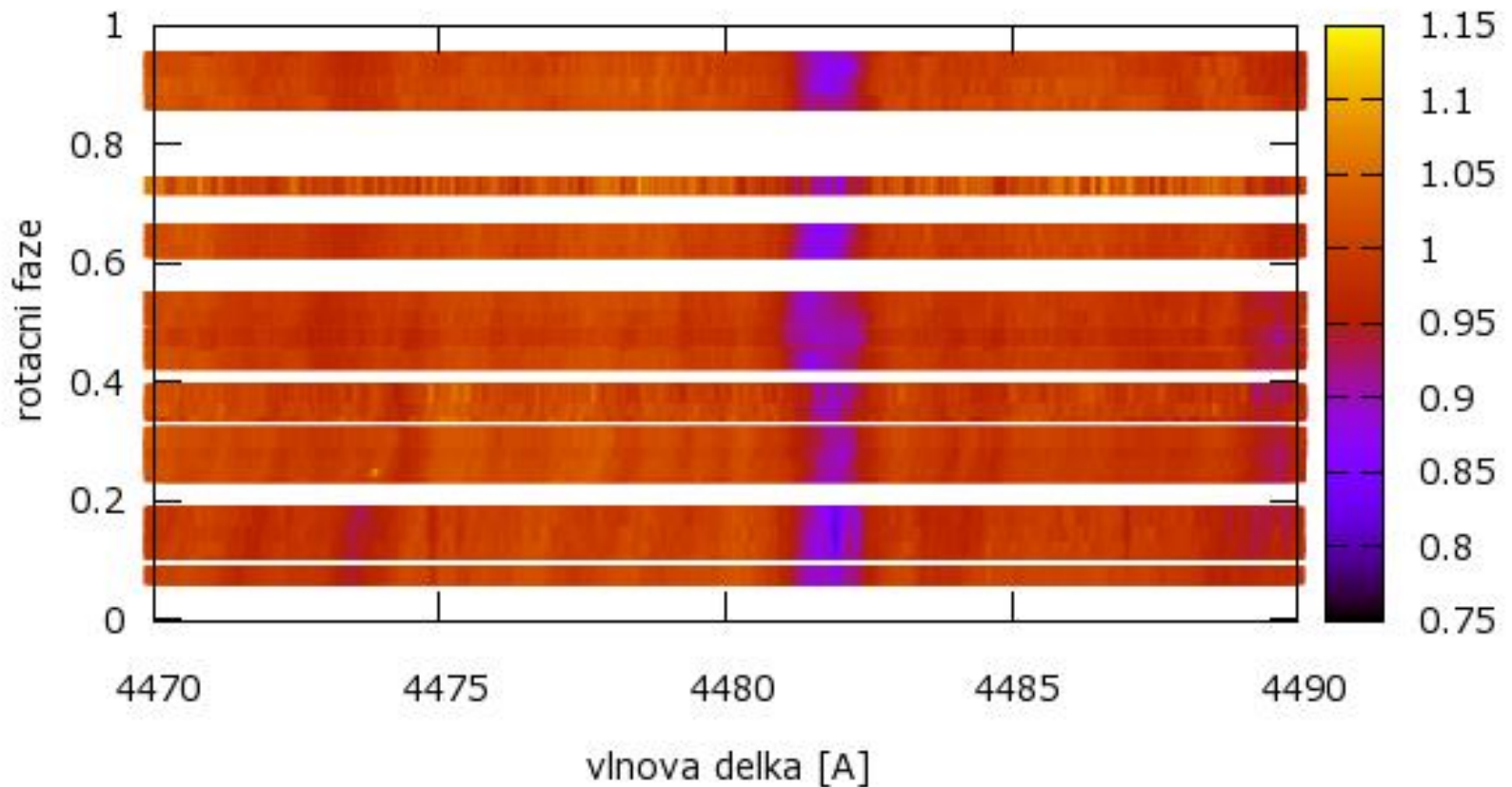




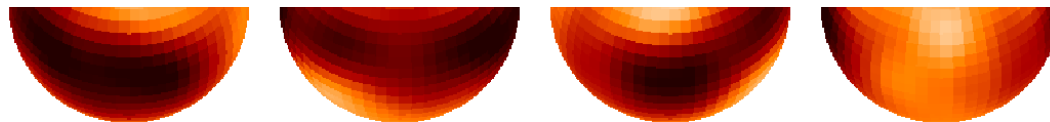
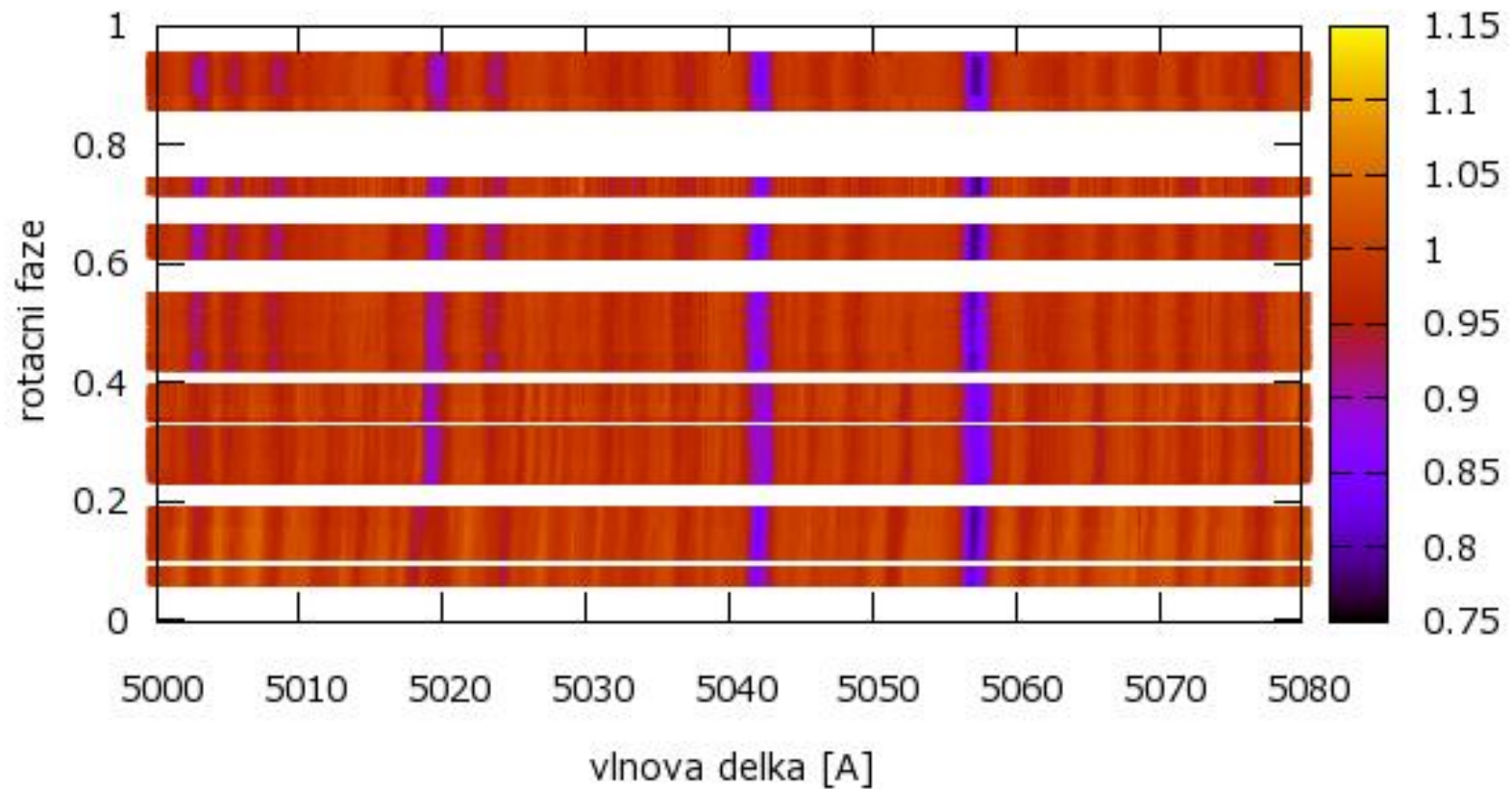
V824 Cen – MgII 4481 Å



V824 Cen – MgII 4481 Å

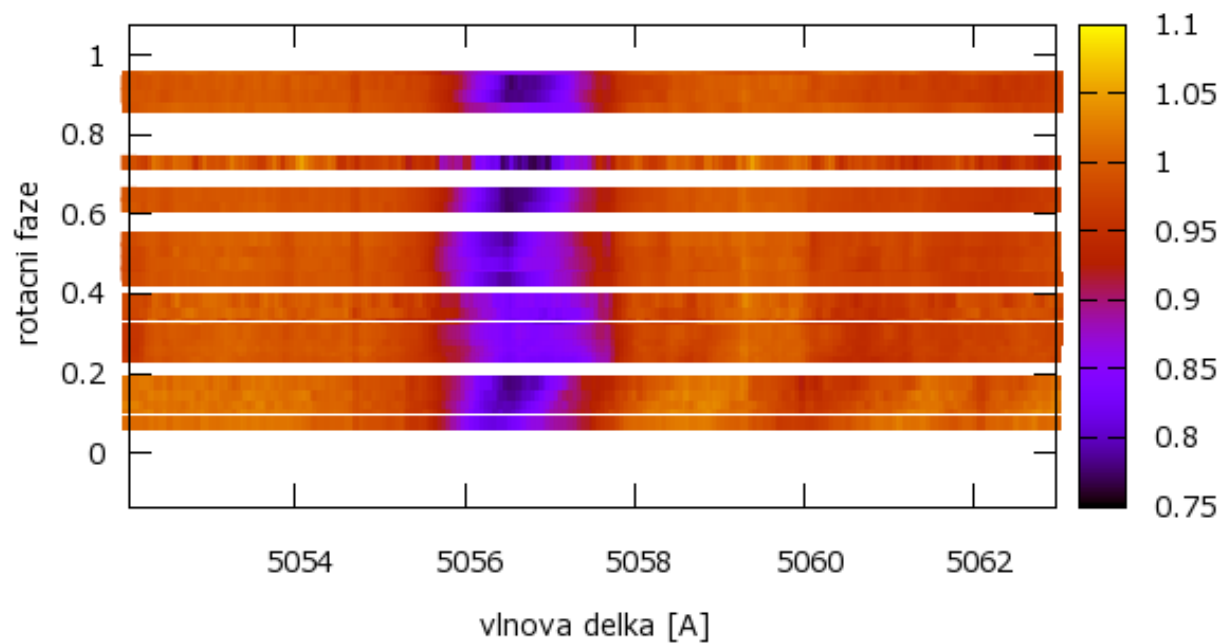
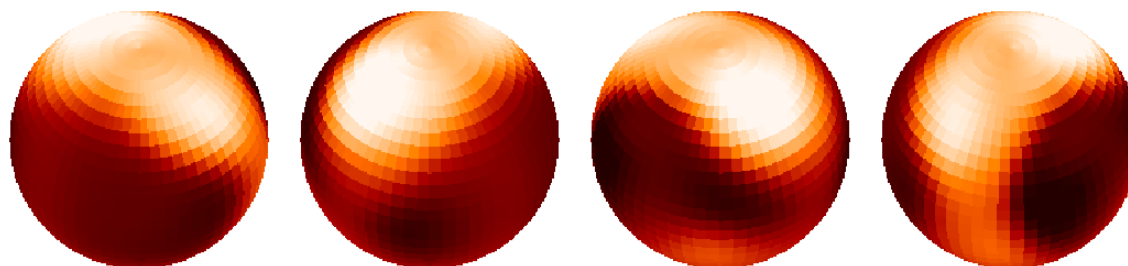


Si 4130 Å

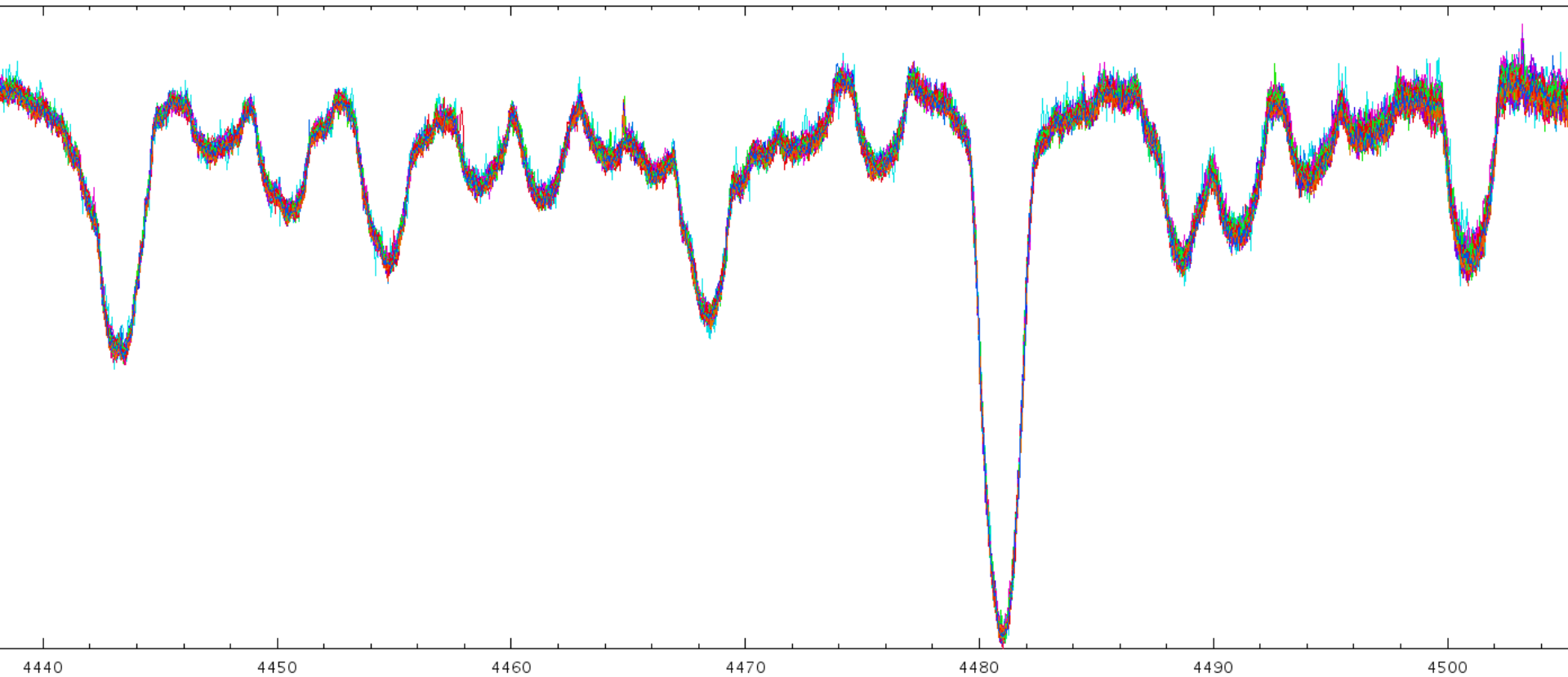


V824 Cen

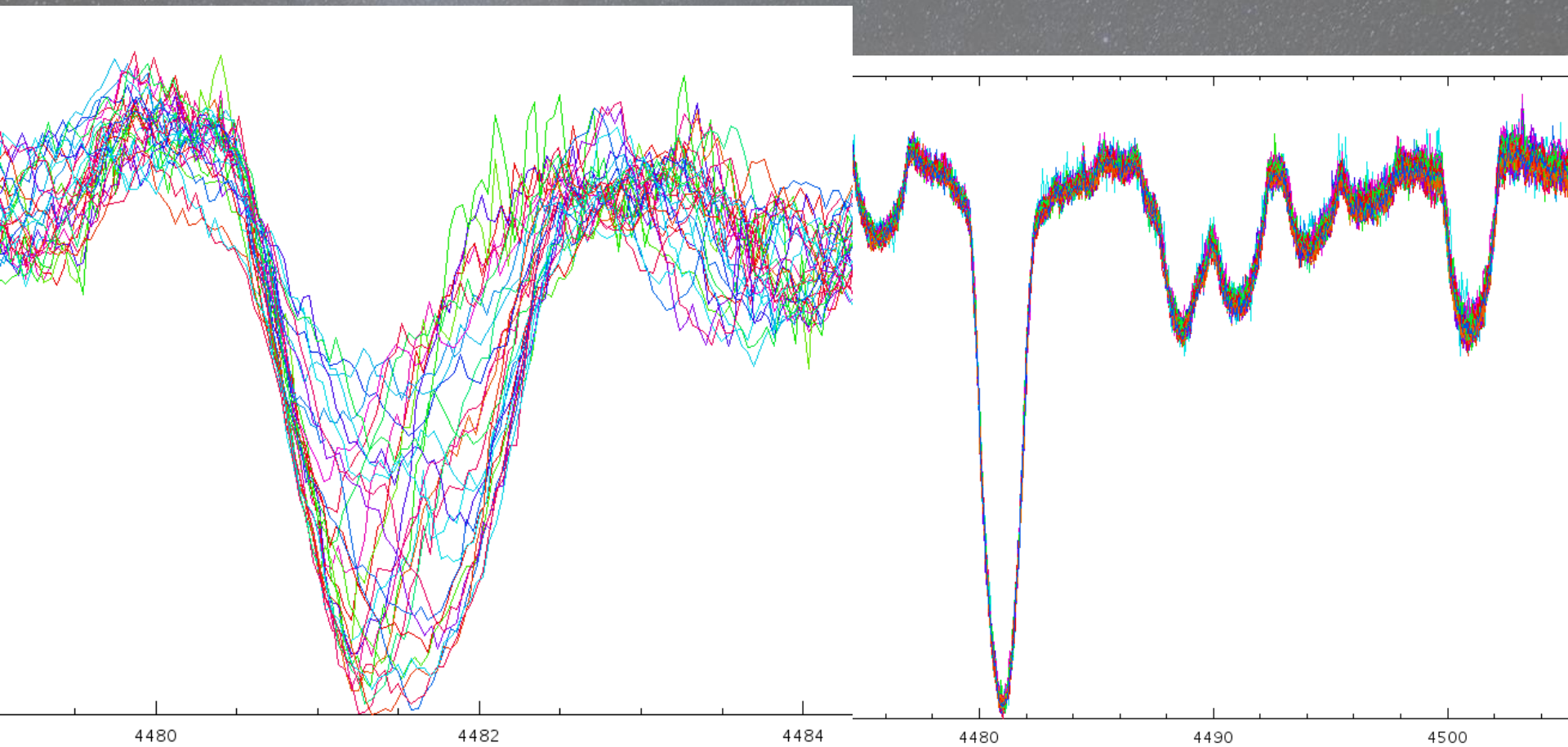
Si 5055 Å



σ Scl



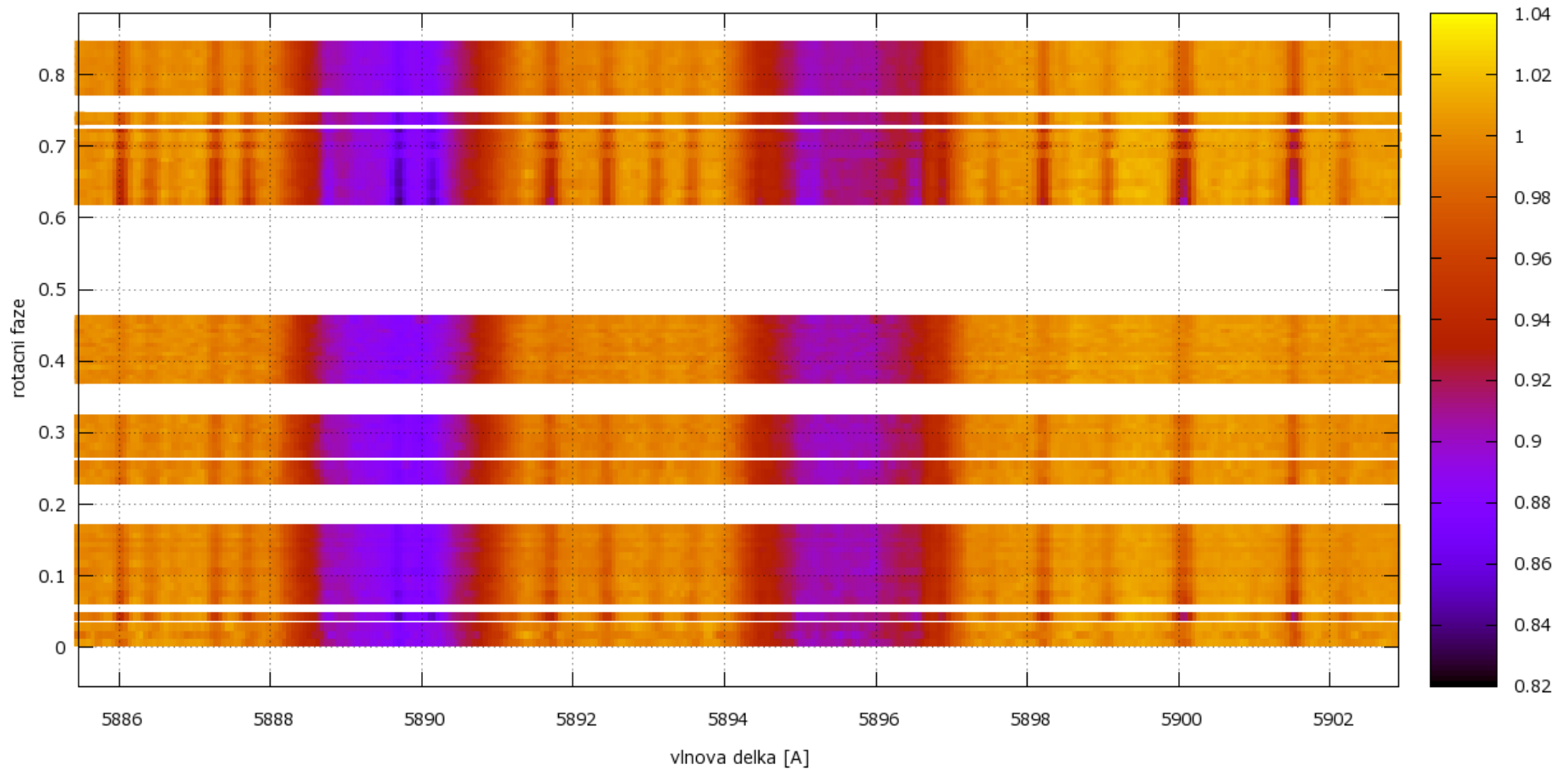
σ Scl



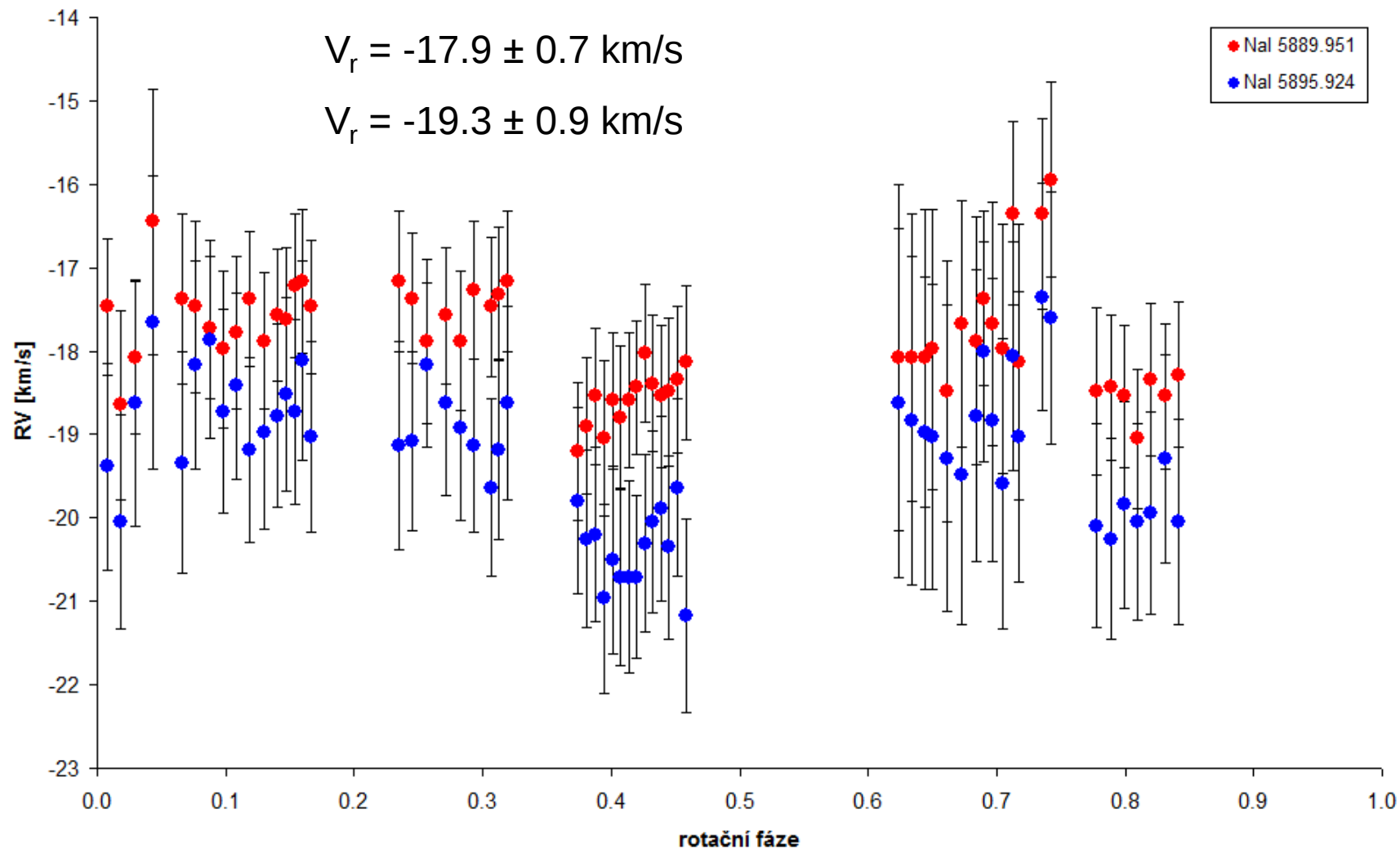
σ Scl

- Really variable star?
- 60 spectra – cca 9 hours of integration time
- without changes – STANDARD
(negative results – results too 😊)
- radial velocity -15.4 ± 0.5 km/s (SIMBAD)

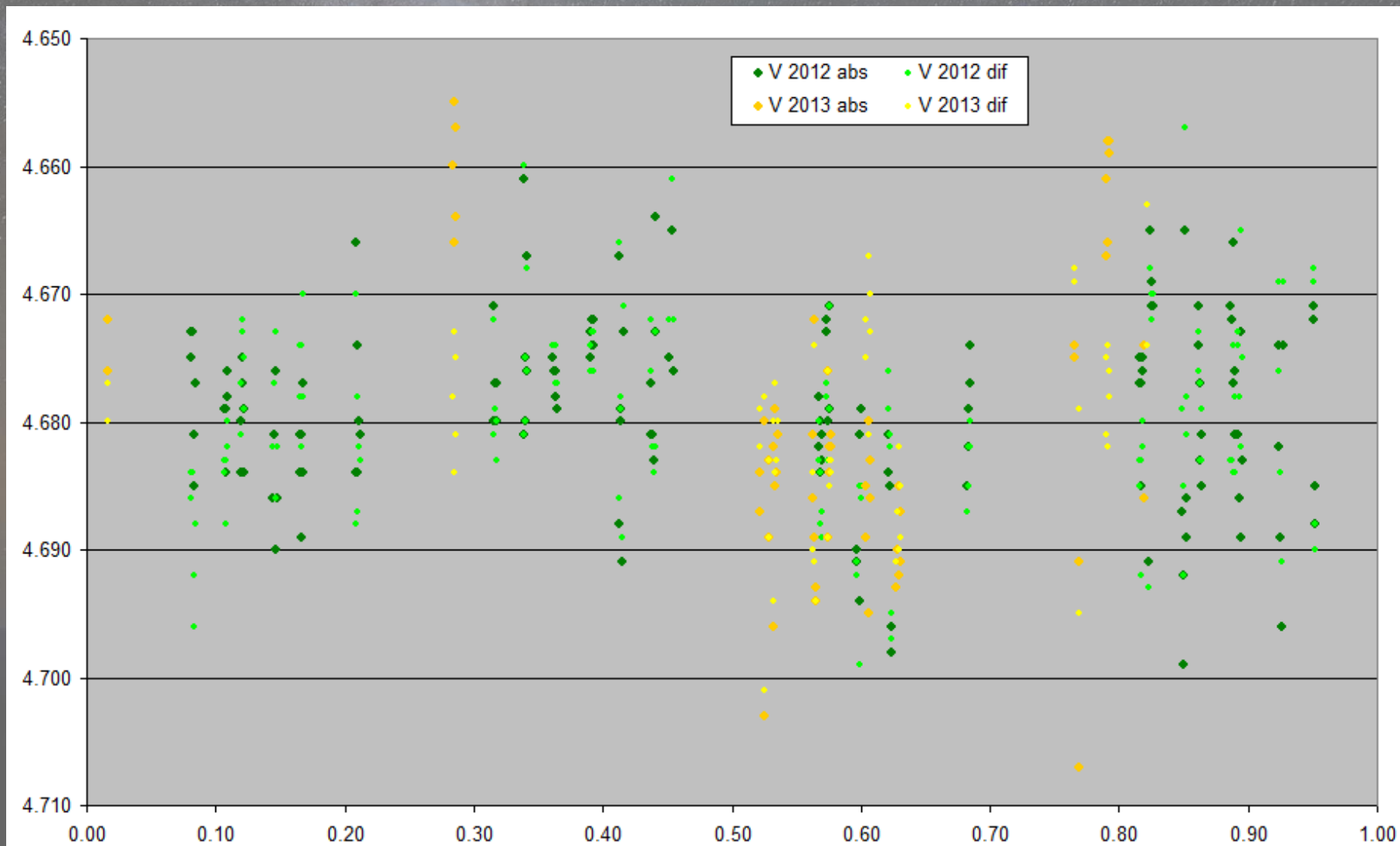
σ Scl



σ Scl – really standard?



HD 64740



HD 64740

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H. Pedersen and B. Thomsen

2.1. He $\lambda 4026 \text{ \AA}$ Photometry

The observations were carried out at the Danish 50 cm telescope, La Silla (January 17 - February 9, 1976) and at the ESO 1 m telescope (February 10 - February 19, 1976). The spectrometer, data acquisition, and programming were as described by Pedersen (1976a). To improve accuracy a new index definition was used:

$$R = I_{\text{line}}/I_{\text{continuum}} = I[4021.7, 4030.7]/(I[4013.2, 4020.7] + I[4031.7, 4039.2]) \quad (1)$$

where $I[\lambda_1, \lambda_2]$ denotes the intensity measured in the wavelength range from λ_1 to λ_2 . A high value of R thus corresponds to a small equivalent width. The intensities through the “continuum” bands are measured simultaneously using a double slit. An observation of a star consists of a number of periods M . During each of these, no action is expected from the observer. After such a period the teletype prints the current results, and the observer may decide the subsequent programme path. Each period in turn consists of four integrations repeated N times and defining N values of the index R . N is a preselected number. The best value for the result of the observation is

$$R = \sum^{MN} I_{\text{line}} / \sum^{MN} I_{\text{continuum}} \quad (2)$$

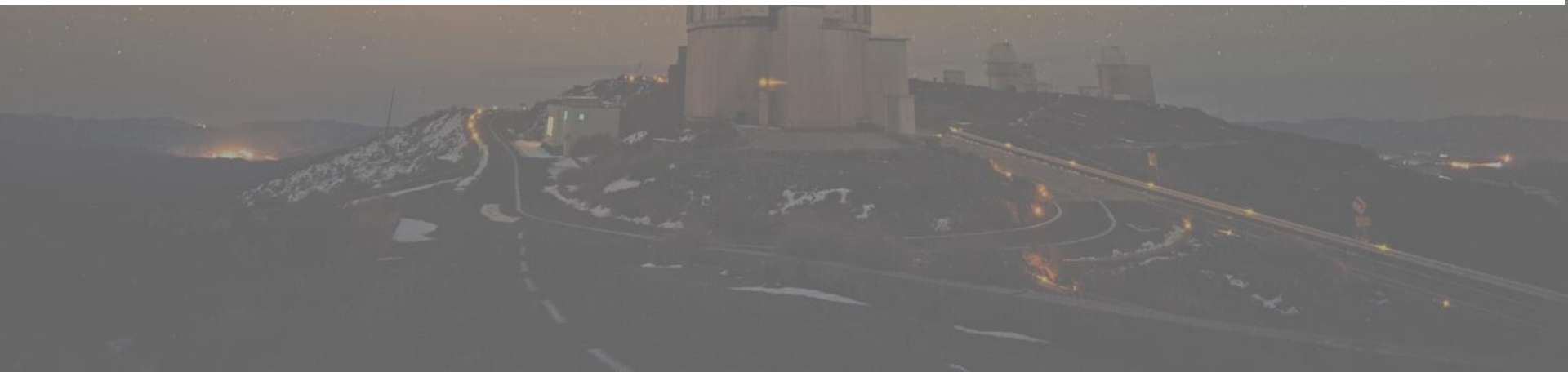
HD 64740

3. TRANSFORMATION TO THE I_{4026} SYSTEM

The spectral bands used by Nissen (1974) to define the I_{4026} system are not far from those used in the present study. A simple relation between R and I_{4026} must therefore be expected. Excluding one star, HR 3663, which is discussed separately, the remaining nine stars in common define a linear relationship (see figure 6). A linear least squares programme (Gammelgaard 1968) using weights in both coordinates has been run to find the relation

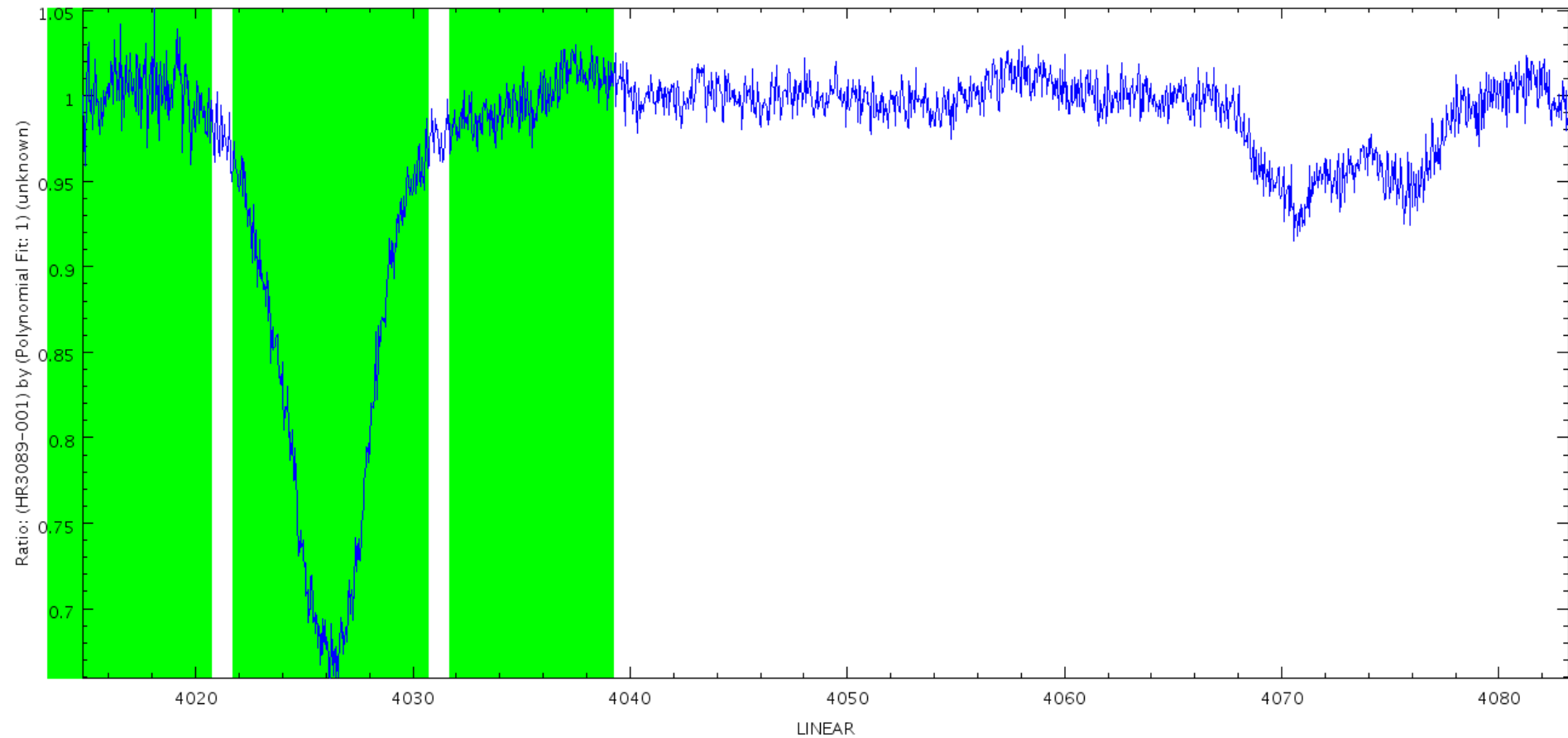
$$R = 0.7173 I_{4026} + 0.4530 \quad (10)$$

The mean errors in I_{4026} have been communicated by Nissen (1976b).

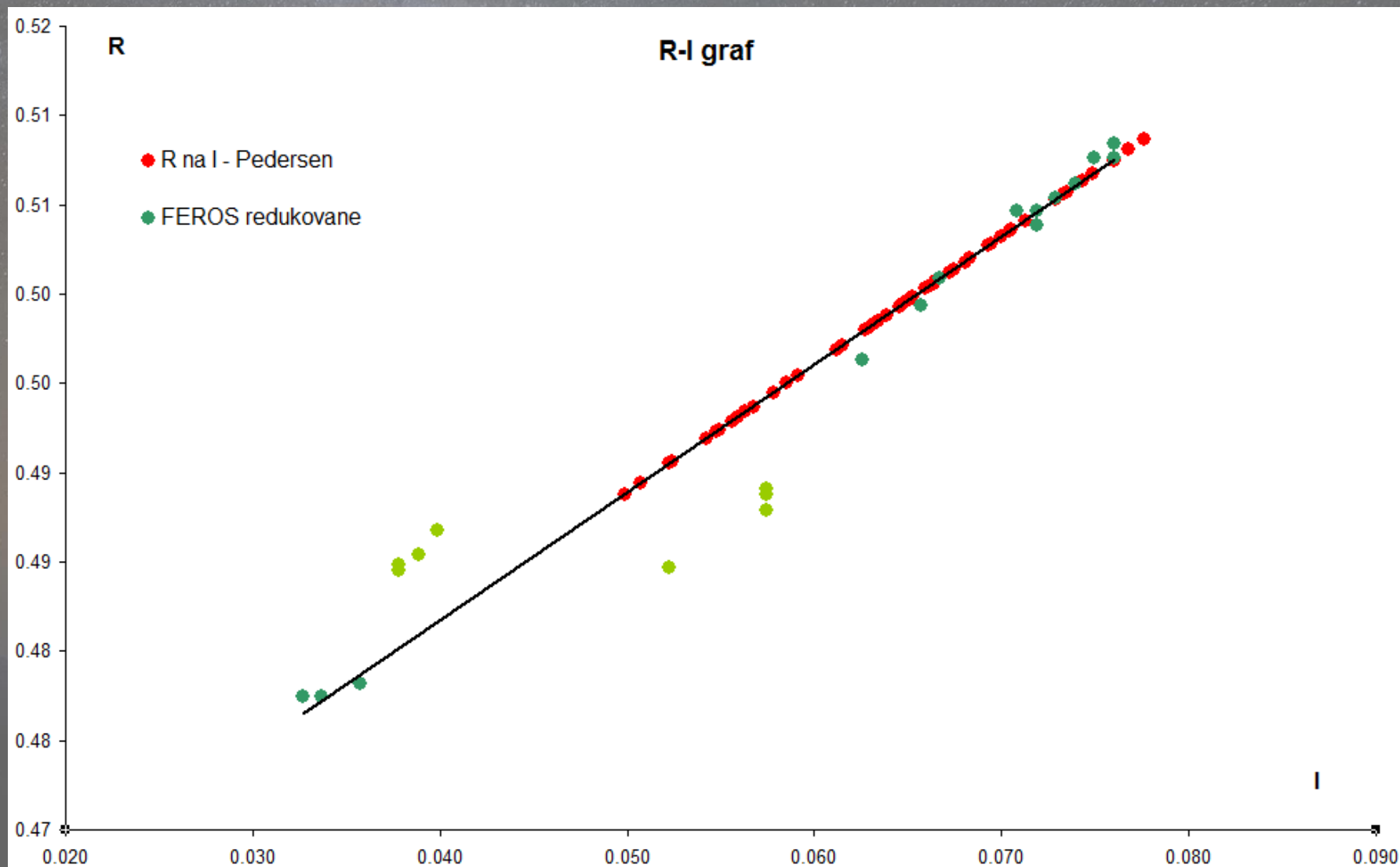


HD 6470 – R and I index

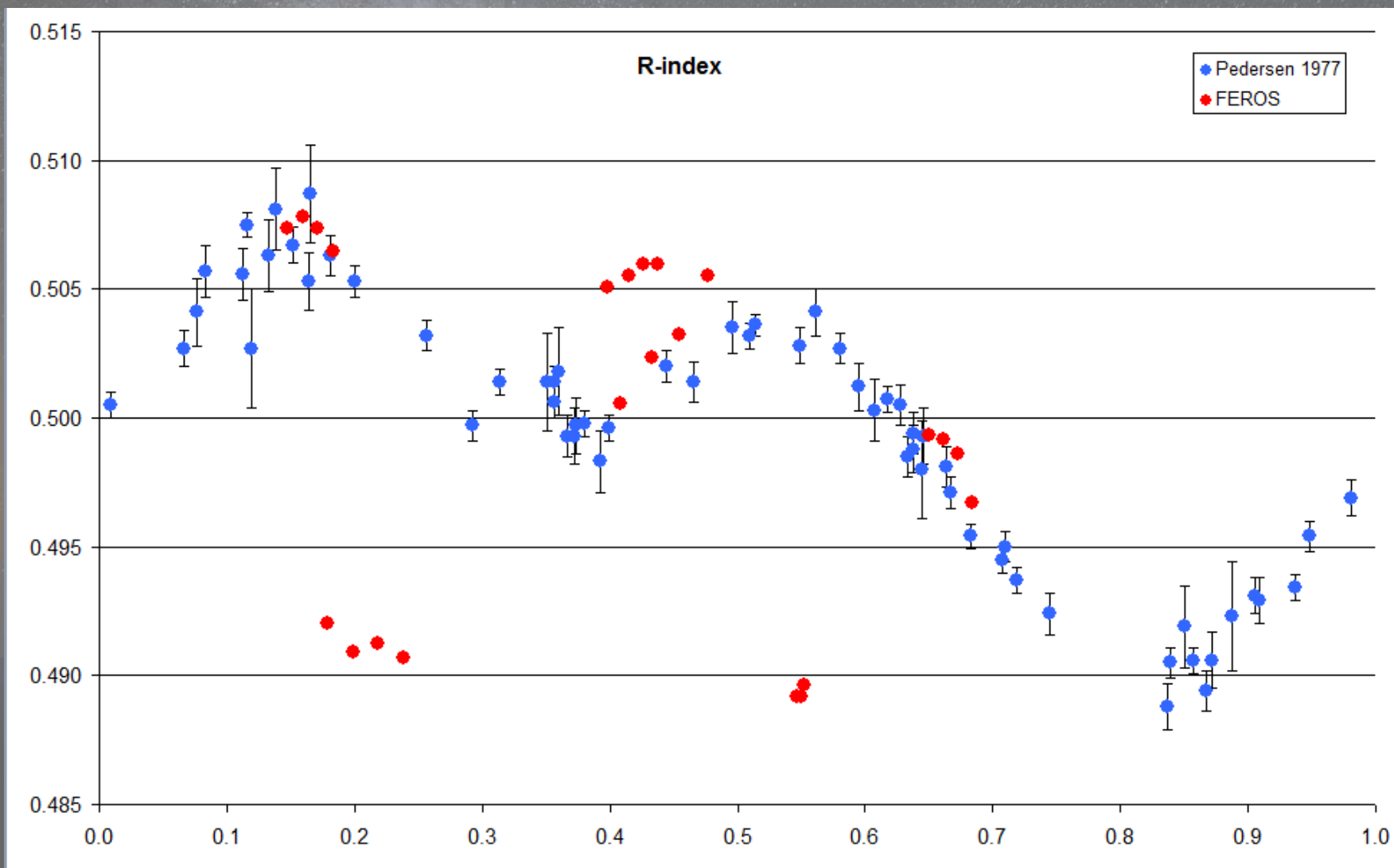
2-d compound coordinate system



HD 64740



HD 64740



HD 64740

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Astronomy
&
Astrophysics

Ultraviolet and visual flux and line variations of one of the least variable Bp stars HD 64740*

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Received 29 December 2012 / Accepted 23 May 2013

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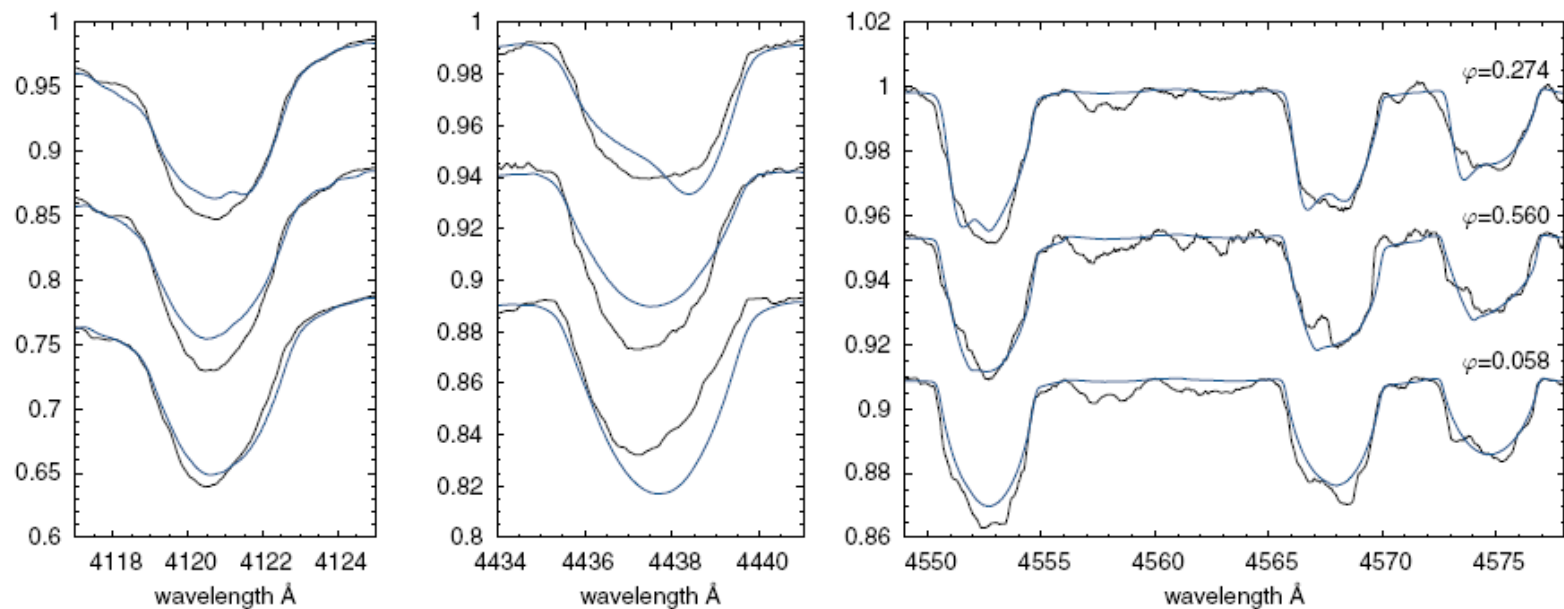


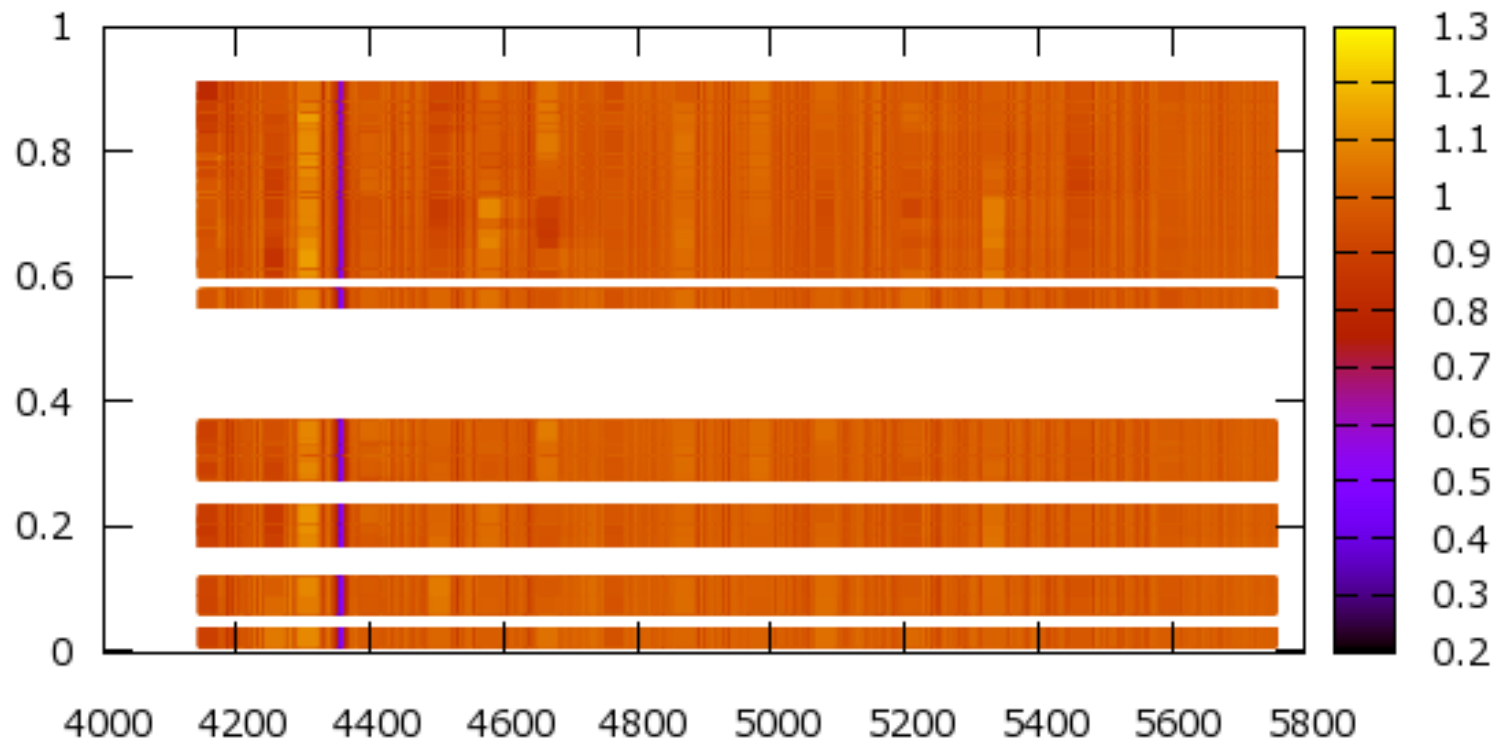
Fig. 12. Line profiles of individual helium and silicon lines in different phases (observed with FEROS) compared with line profiles predicted using abundance maps. Line profiles were vertically shifted to better demonstrate the line variability. *Left and middle:* Helium lines. *Right:* Silicon lines.

BS Cir

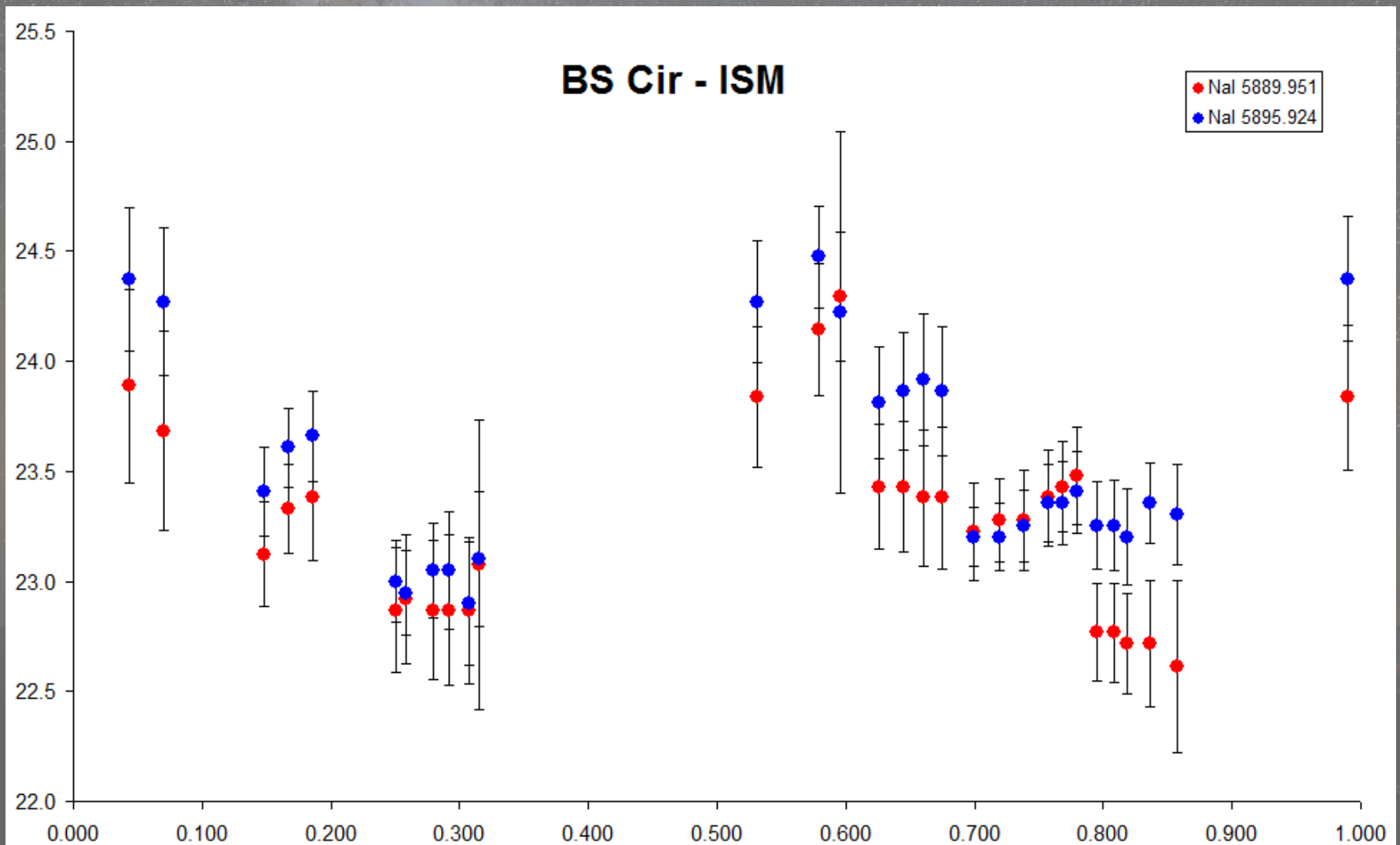
- very interesting star
- changes in rotation (Zdeněk Mikulášek)
- cooler CP star – many spectral lines



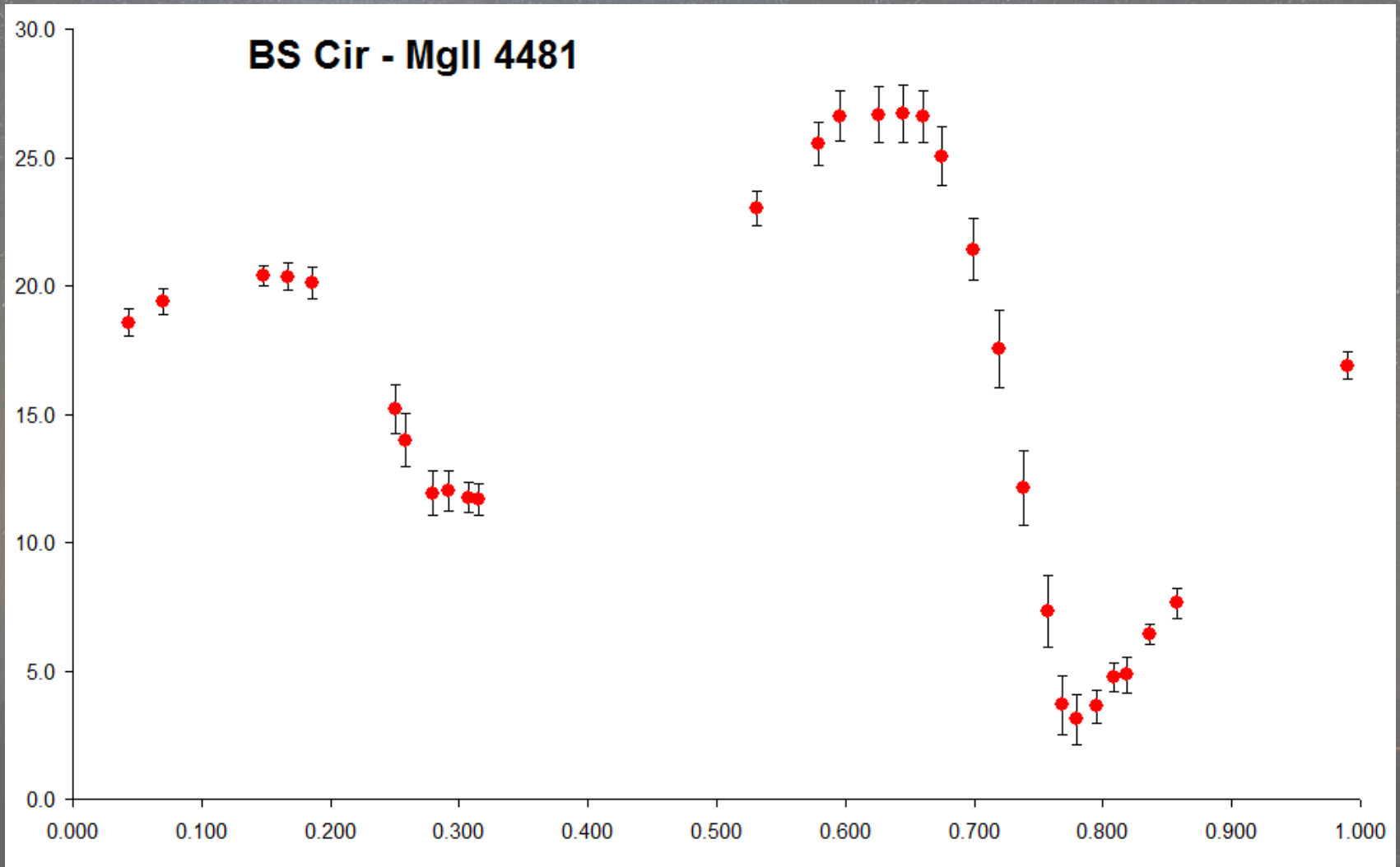
BS Cir



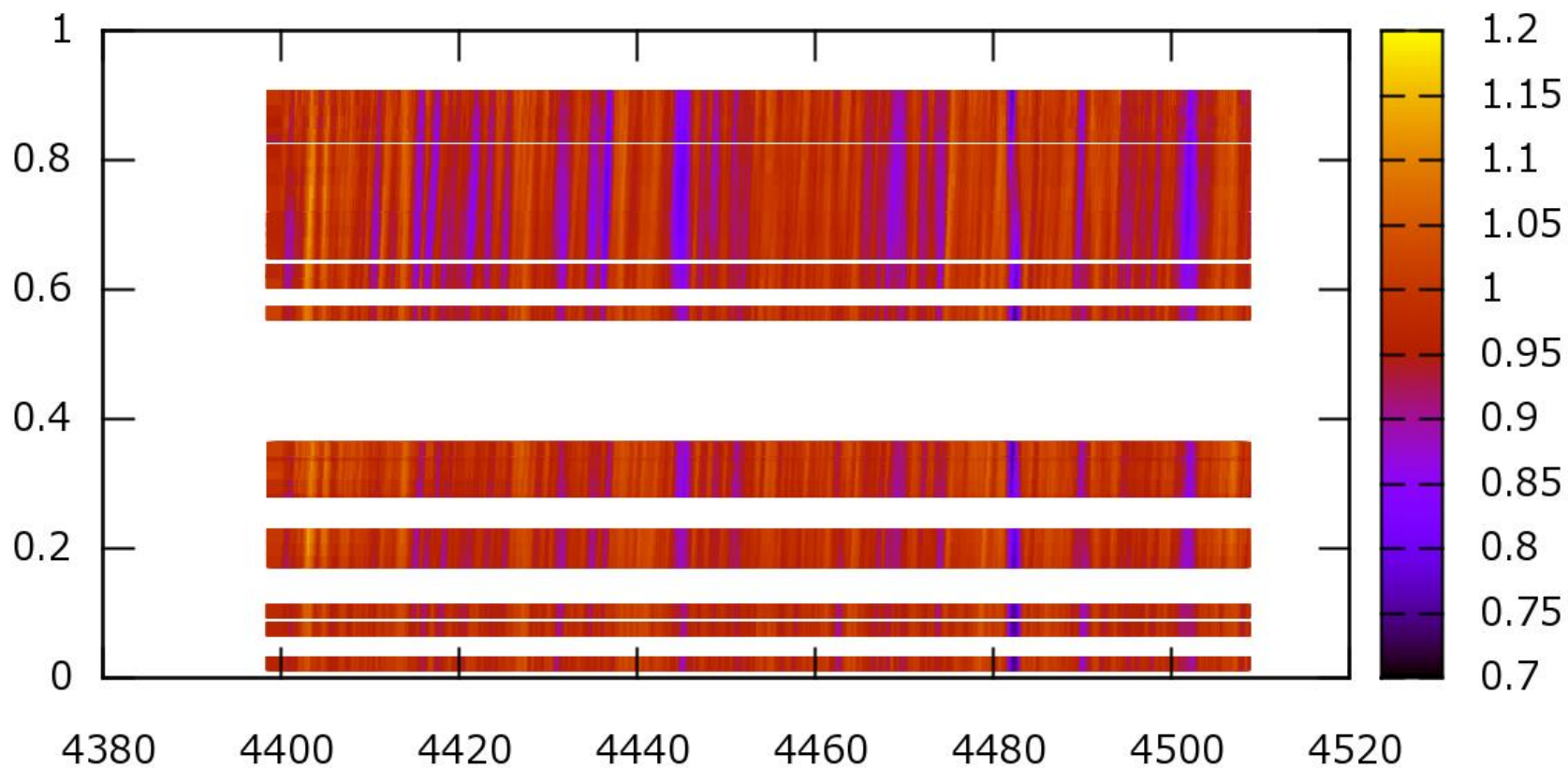
BS Cir - ISM



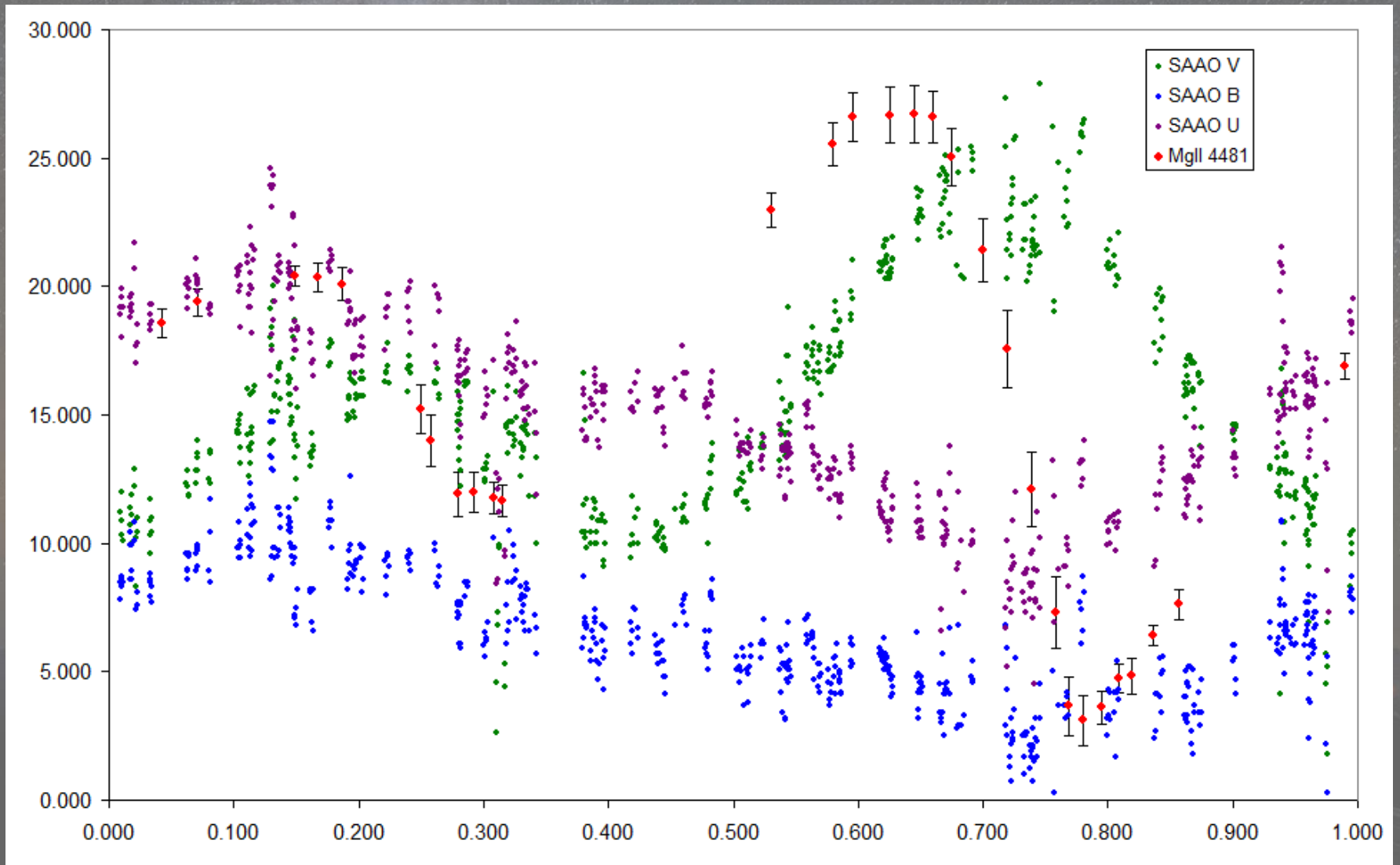
BS Cir – MgII 4481 Å



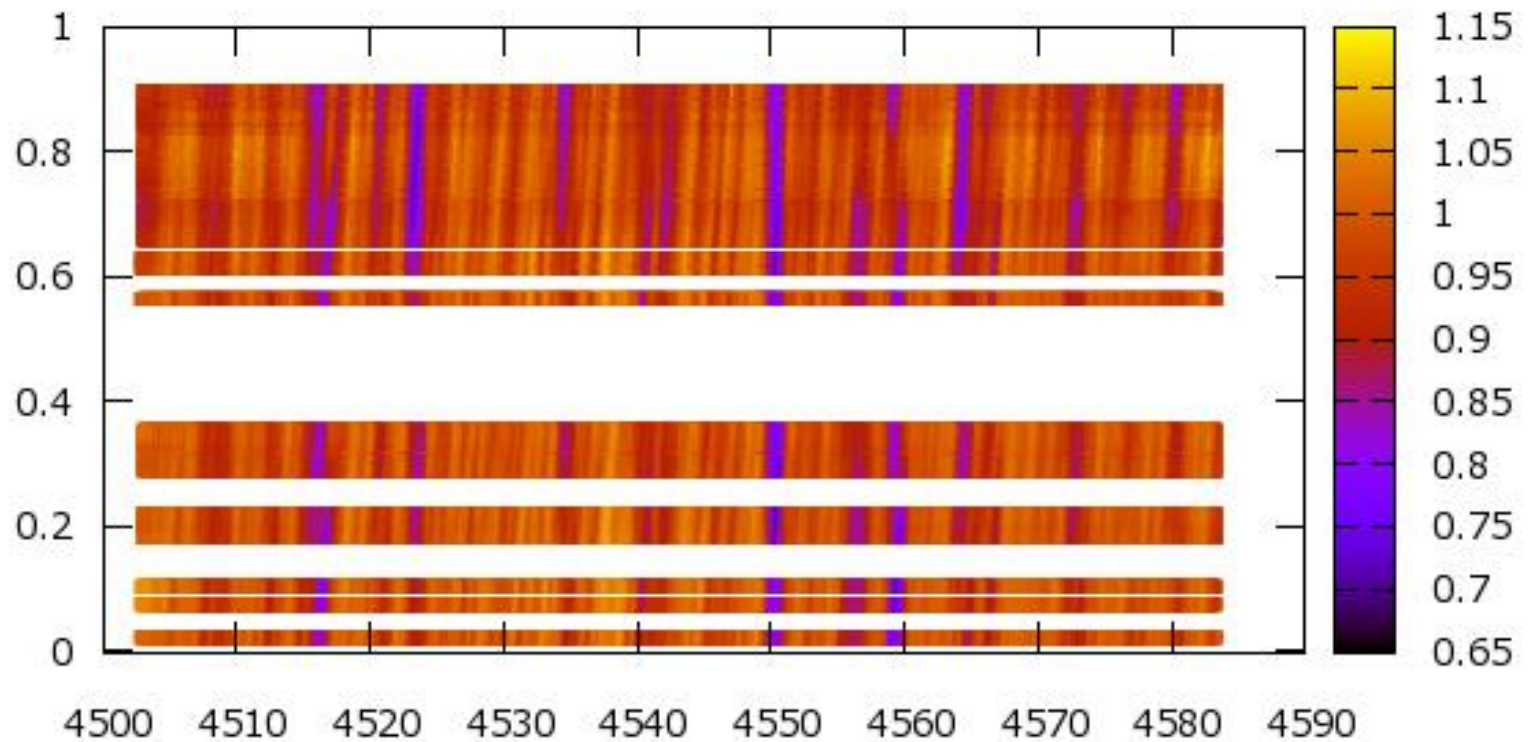
BS Cir – MgII 4481 Å



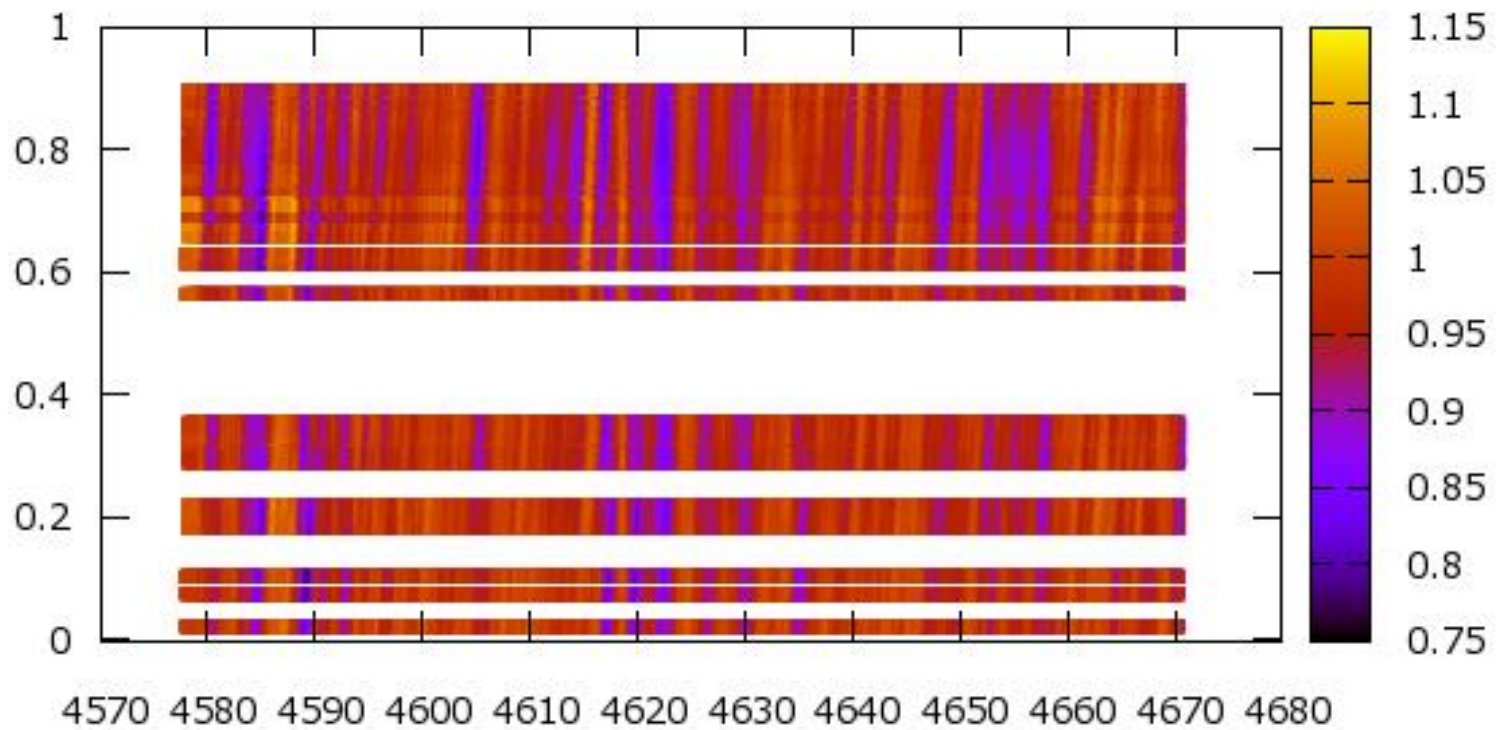
BS Cir – *UBV* + *RV*



BS Cir – many lines



BS Cir – many lines



Next work

- BB Cet
- V913 Sco
- V1010 Oph a FO Vir
 - binary stars
 - RV curves (KOREL, FDBINARY)

Thank you
for your attention

