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**RoPACS**



# *Radial velocity estimations from Calar Alto:*



[www.caha.es](http://www.caha.es)

# *Preliminary results*



 **CENTRO DE ASTROBIOLOGÍA**  
ASSOCIATED WITH THE NASA ASTROBIOLOGY INSTITUTE

under supervision of:  
David Barrado

# Overview

Spectroscopic campaigns at Calar Alto:

- search for false positives: 19c-4-06396 and 19a-4-08320 cases
- EBs from the 17h-field: preliminary results
- EBs from the 19h-field: really recent analysis

Next steps

# *Spectroscopic runs at Calar Alto*

Three runs with a total of 6 nights (June, July and August):

- dispersion:  $\sim 0.39 \text{ \AA/pix}$
- wavelength range:  $\sim 800 \text{ \AA}$ ,  $\lambda_c$  at H $\alpha$  ( $\lambda 6563$ )

## Targets

- 19c-4-06396; 19a-4-08320.
- 17b-2-05124; 17e-3-02003; 17c-1-02355;  
17h-4-0129.
- 19c-3-08647; 19d-2-09173; 19f-4-05194.

3.5m telescope



TWIN spectrograph

# Overview

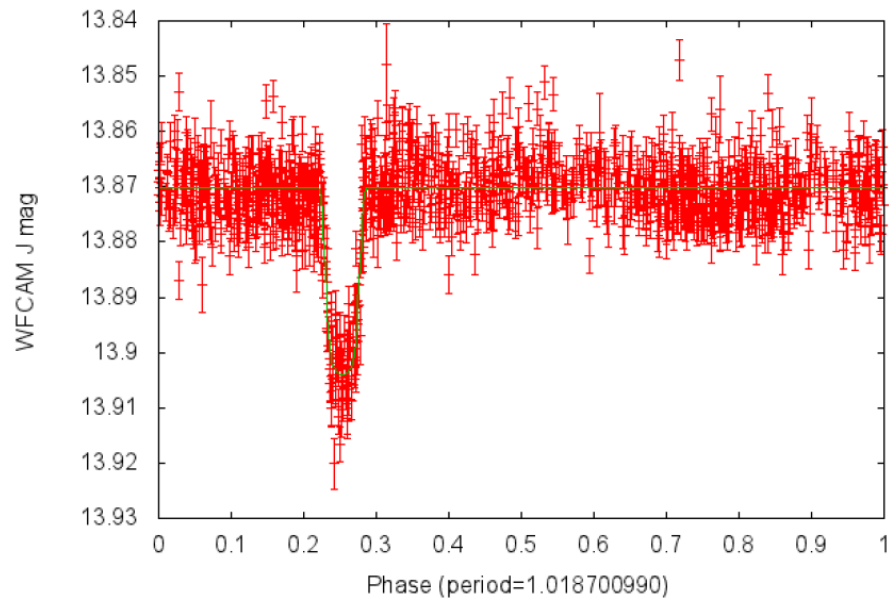
## Spectroscopic campaigns at Calar Alto:

- search for false positives: 19c-4-06396 and 19a-4-08320 cases
- EBs from the 17h-field: preliminary results
- EBs from the 19h-field: really recent analysis

## Next steps

# 19c-4-06396

Folded lc for 19c\_4\_06396 with MA transit model with parameters:  
 $p=0.17143, b_2=0.450311, om=40.9226, t_0=0.253199, mag_0=13.8703$



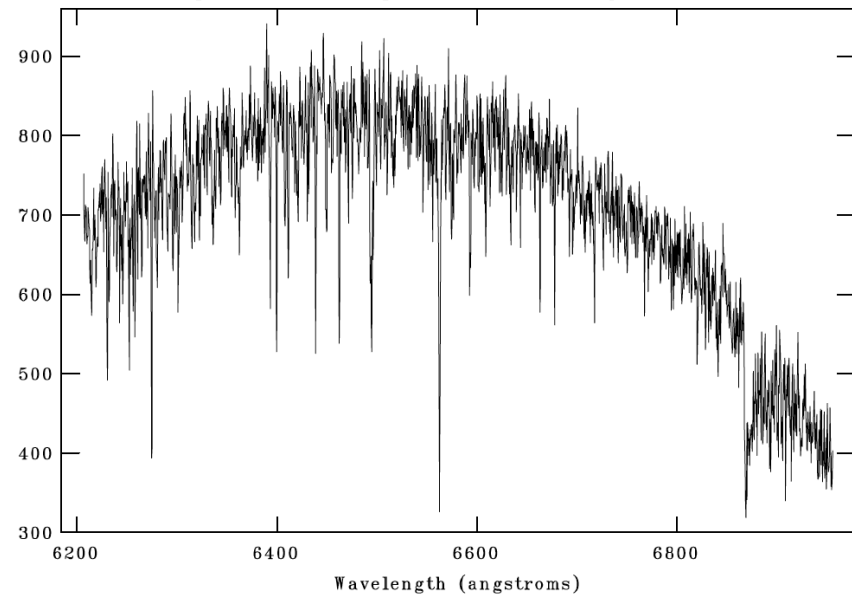
– P1 candidate

– hot-Jupiter;  $P = 1.0187$  days

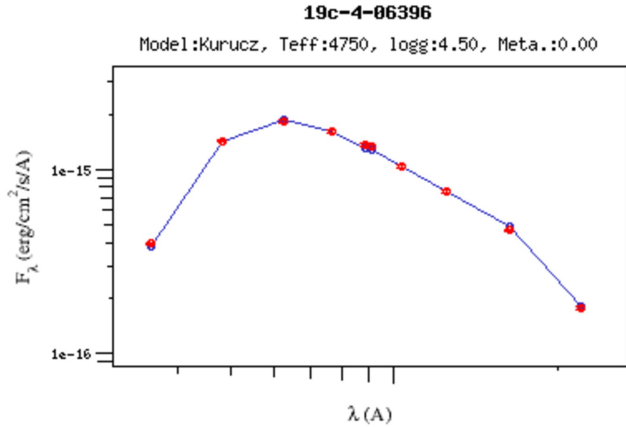
– 18 epochs (600-900s)

– K-dwarf, quite active (?)

NOAO/IRAF V2.14EXPORT peruz@ioa-guest6.ast.cam.ac.uk Fri 14:47:40 26-Aug-2  
[cruP\_0058.wl.fits]: 19c\_4\_06396 900. ap:1 beam:1



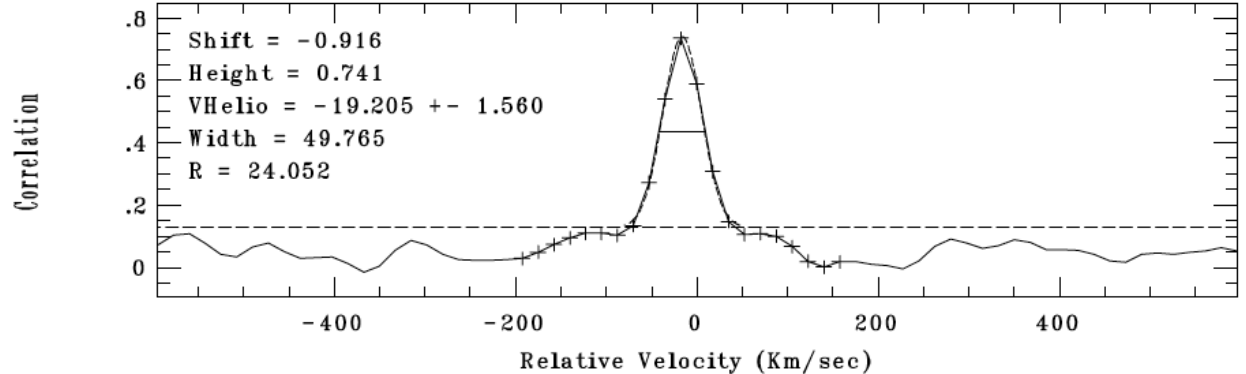
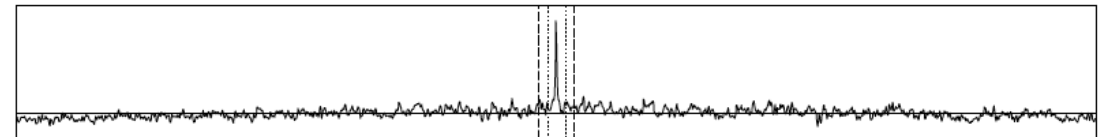
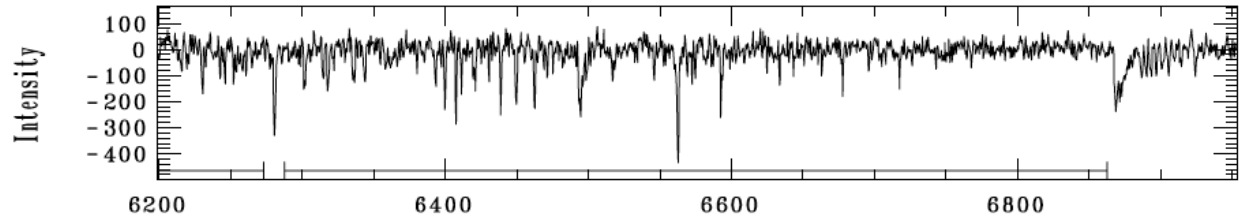
# 19c-4-06396



SED fitting: VOSA (VO Sed Analyzer)

Solar metallicity  $\rightarrow$  Teff = 4750K, logg = 4.5

NOAO/IRAF V2.14EXPORT peruz@ioa-guest6.ast.cam.ac.uk Fri 16:06:16 26-Au  
Object='cruP\_0063.wl.fits' Reference='../Templates/T4750G45N\_tpl  
Star='19c\_4\_06396' Temp='T4750G45N\_tpl' npts=1967 aperture=1

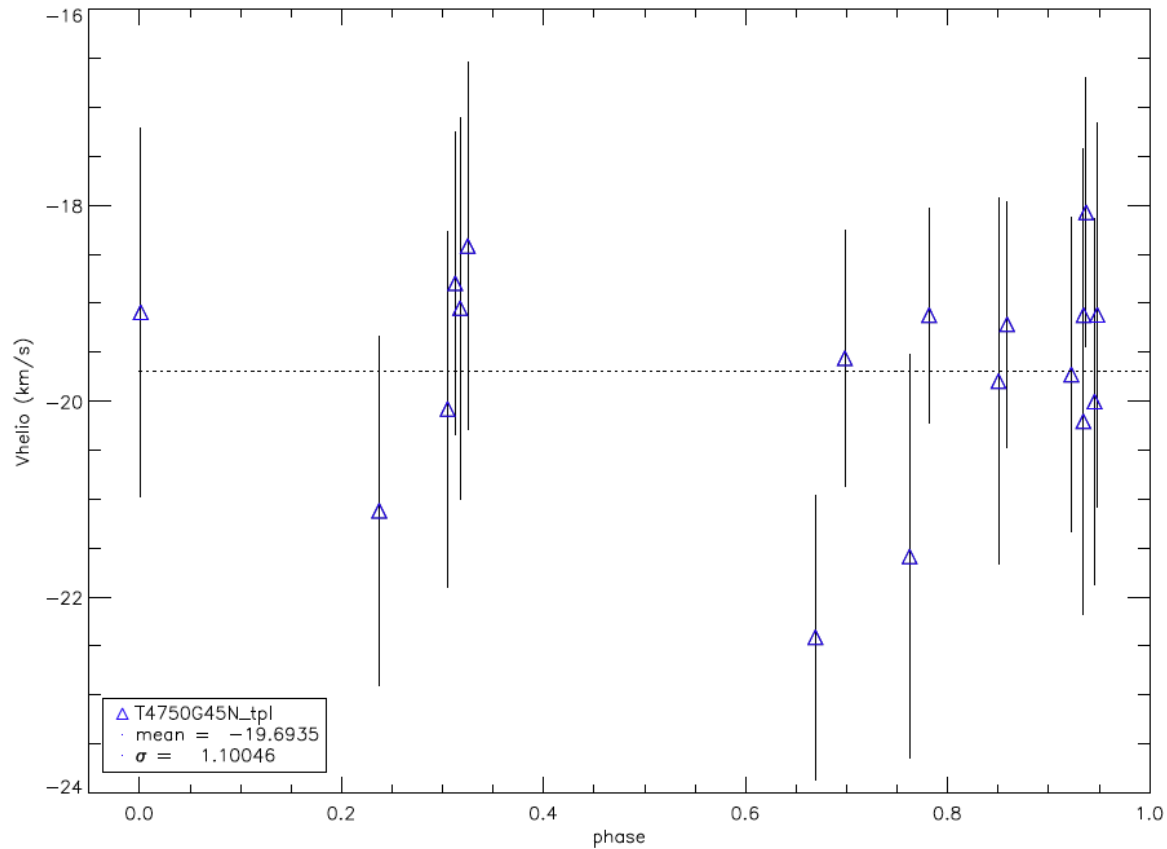


Synthetic spectrum from

Munari et al. (2005)

– RV: fxcor/IRAF

# 19c-4-06396



$\sigma \sim 1.1 \text{ km/s}$   
 $M_s \gg M_p$   
 $M_s \sim 0.8 M_{\text{sun}}$

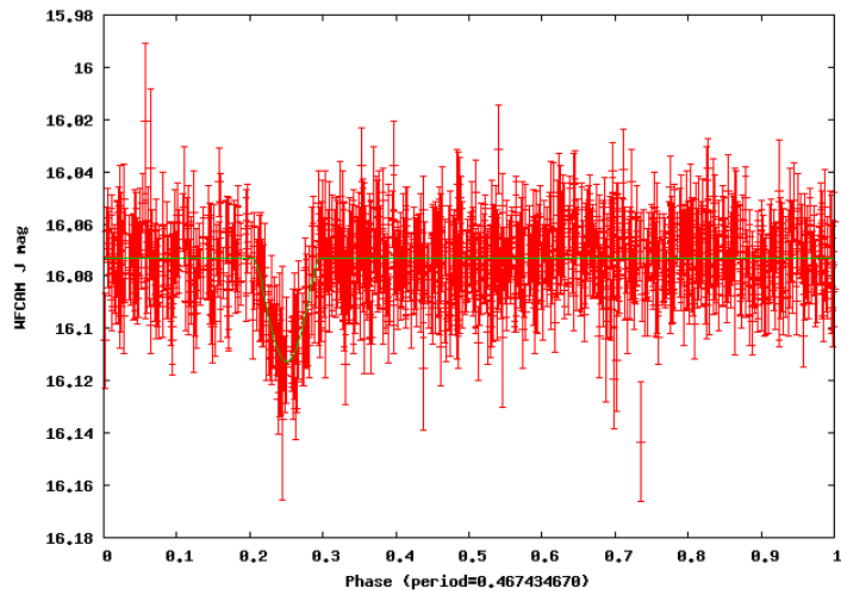
$$K = 28.4 \cdot (P/1 \text{ year})^{-1/3} \cdot (M_p \sin i / M_J) \cdot (M_* / M_{\odot})^{-2/3} \text{ m/s}$$

→  $M_p \sin i \sim 5 M_J$

Perryman (2000)

# 19a-4-08320

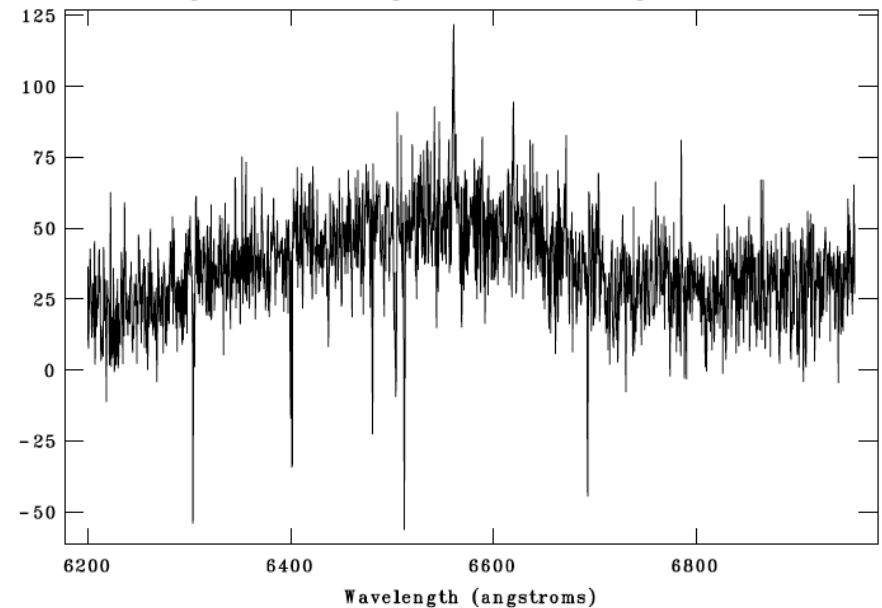
Folded lc for 19a\_4\_08320 with MA transit model with parameters:  
 $p=0.218927, b2=0.756649, on=37.8583, t0=0.250504, nag0=16.8732$



- 11 epochs (1200s)
- M-dwarf

- P1 candidate
- hot-Neptune;  $P = 0.4674$  day

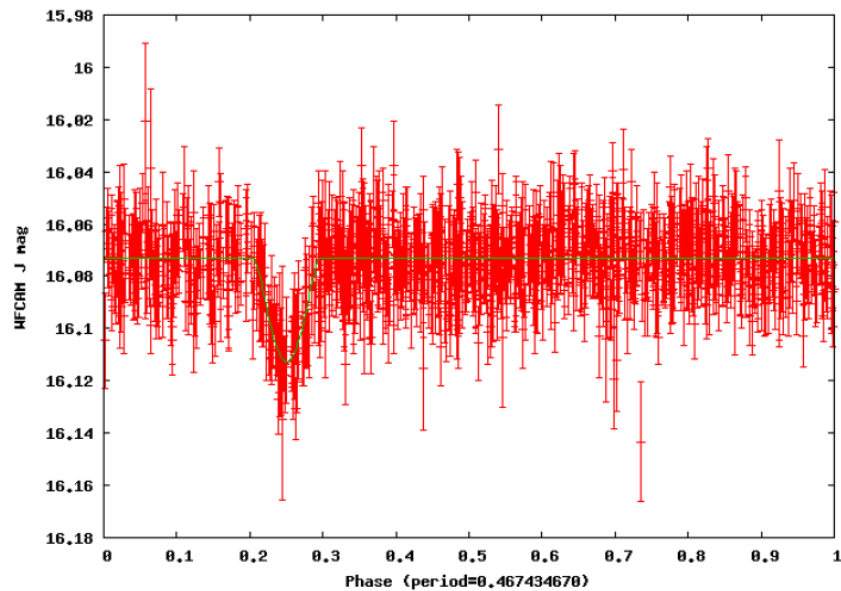
NOAO/IRAF V2.14EXPORT pcruz@LAEFF-CABs-MacBook-Pro.local Mon 11:22:22 03-Oct-  
[cruP\_r0045.wl.fits]: 19a\_4\_08320 1200. ap:1 beam:1





# 19a-4-08320

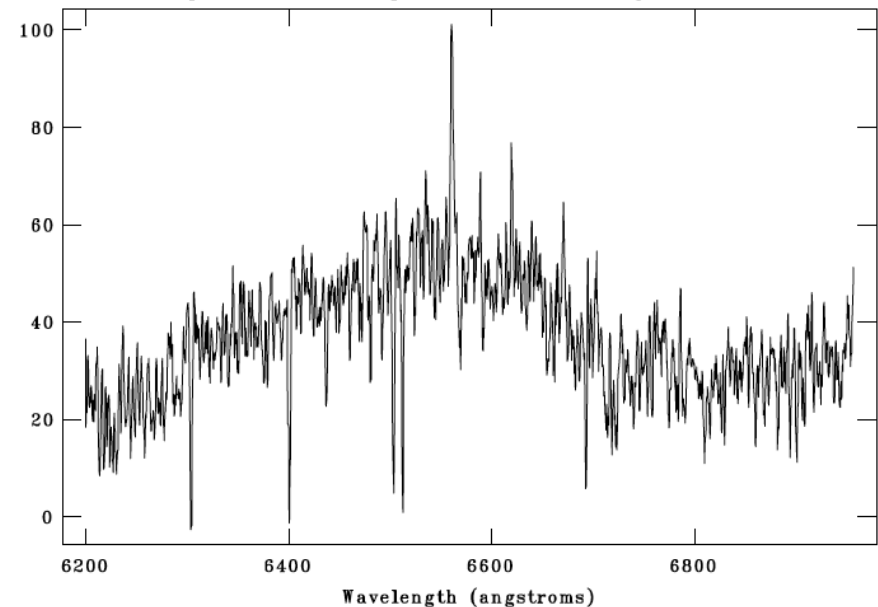
Folded lc for 19a\_4\_08320 with MA transit model with parameters:  
 $p=0.218927, b2=0.756649, on=37.8583, t0=0.250504, nag0=16.8732$



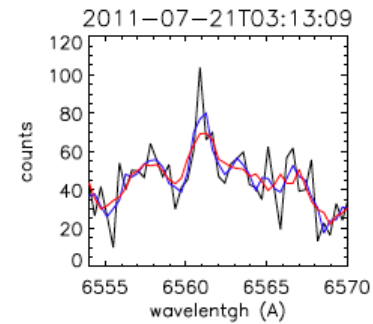
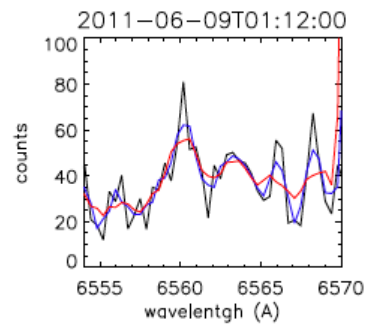
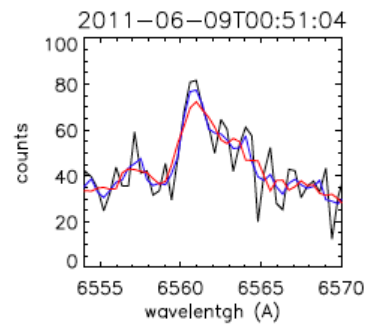
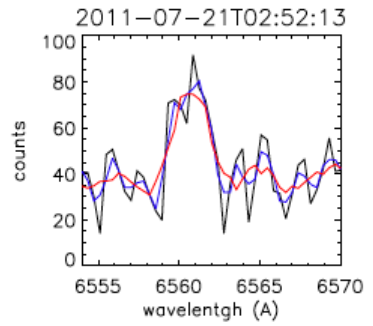
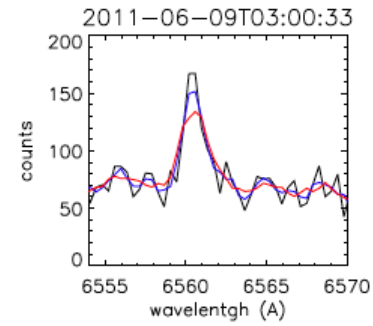
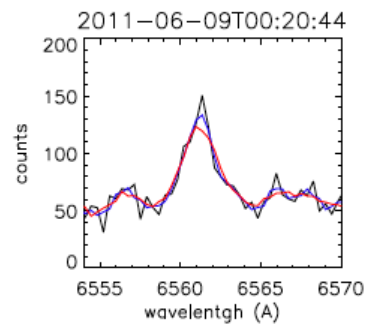
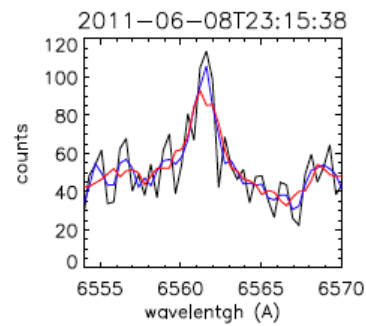
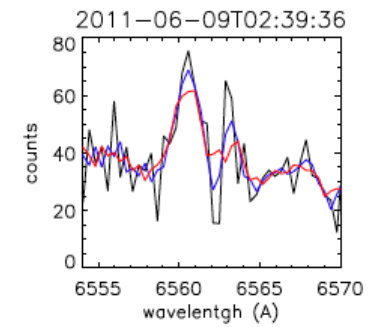
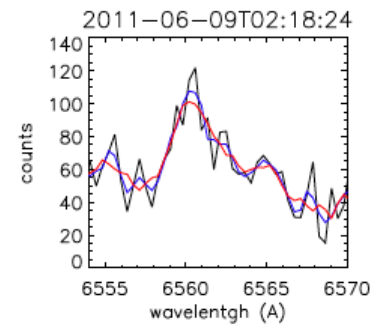
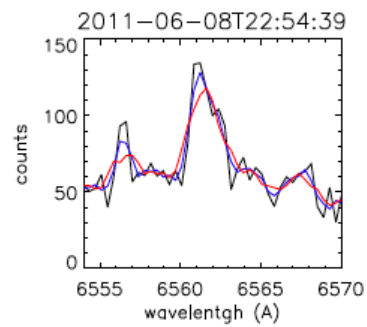
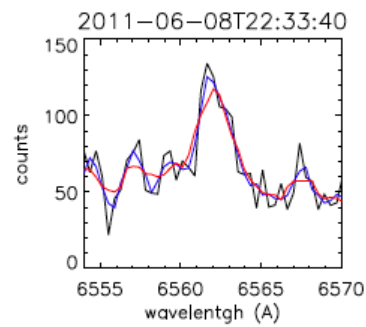
- 11 epochs (1200s)
- M-dwarf

- P1 candidate
- hot-Neptune;  $P = 0.4674$  day

NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro.local Mon 11:22:42 03-Oct-  
[cruP\_r0045.wl.fits]: 19a\_4\_08320 1200. ap:1 beam:1

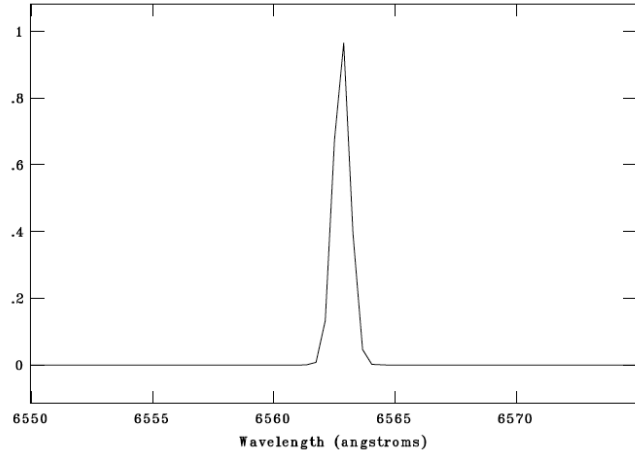


# 19a-4-08320



# 19a-4-08320

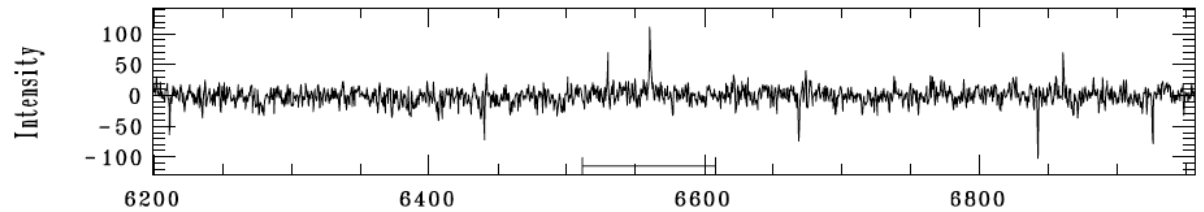
NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro-2.local Fri 10:25:08 07-0c  
[gaussHalpha\_tpl.fits]: gaussHalpha 1. ap:1 beam:1



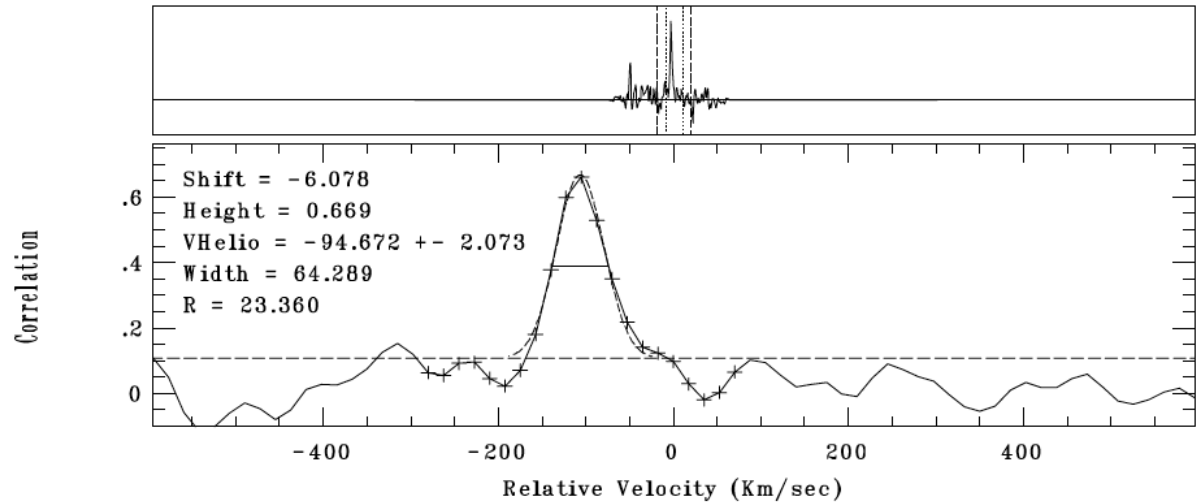
Template: gaussian profile, H $\alpha$  emission line

FWHM from an arc  $\rightarrow$  instrumental resolution

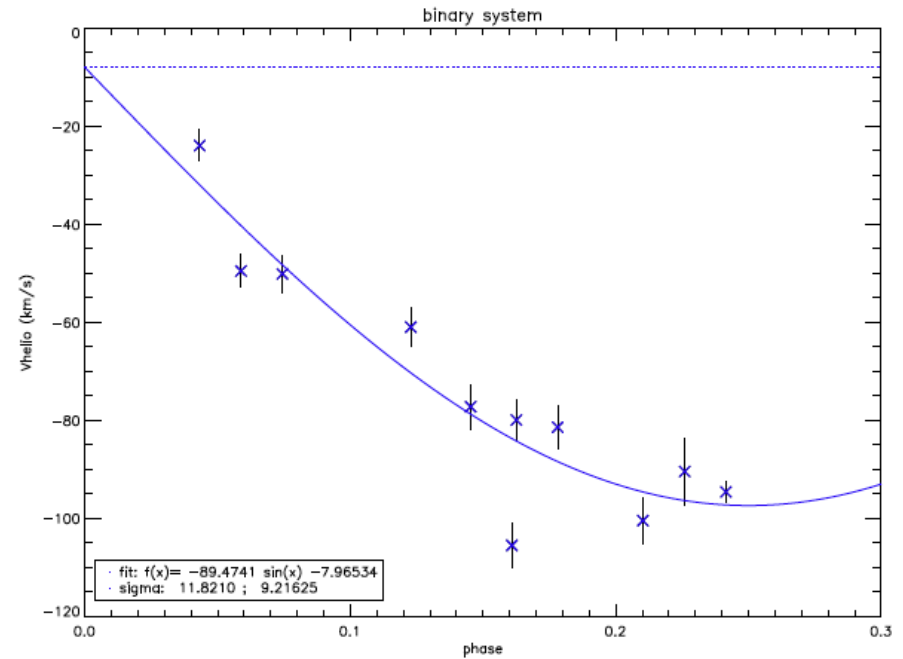
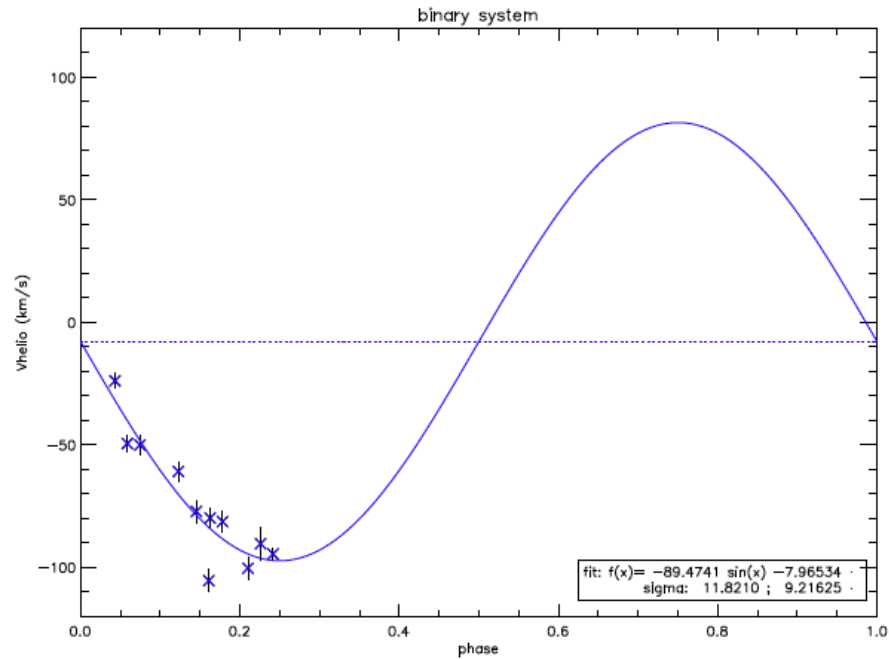
NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro.local Fri 12:25:44 23-S  
Object='cruP\_r0047.wl.fits' Reference='../Templates/gauss/gaussHalp  
Star='19a\_4\_08320' Temp='gaussHalpha' npts=1975 aperture=1



- RV: fxcor/IRAF



# 19a-4-08320



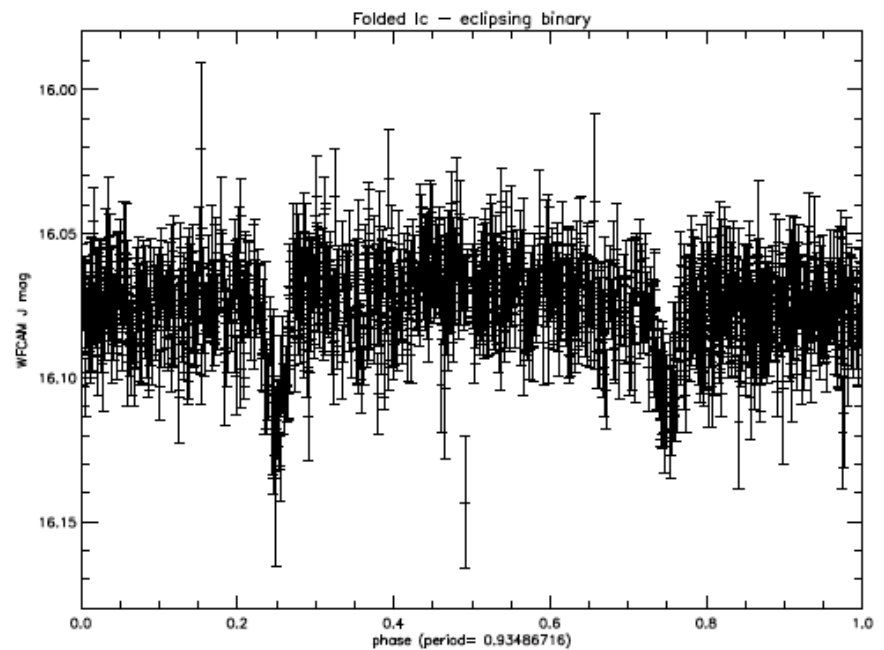
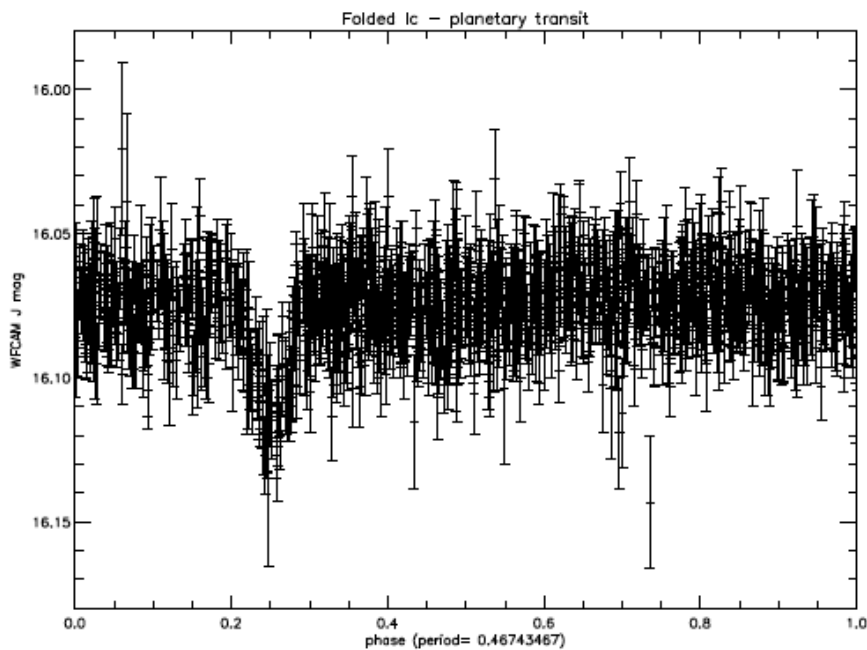
P1 → B2 candidate

P = 0.9349 days

Still needed:

- RV measurements at opposite quadrature
- more spectra with better SNR

# 19a-4-08320



Due to the small difference between depths when the light curve is folded with double period we can suggest this could be a grazing EB with a quiet (?) M star as companion.

# Overview

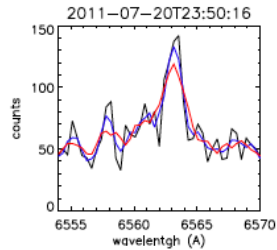
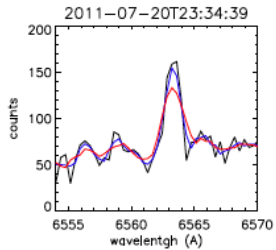
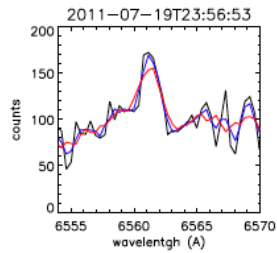
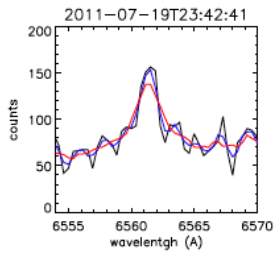
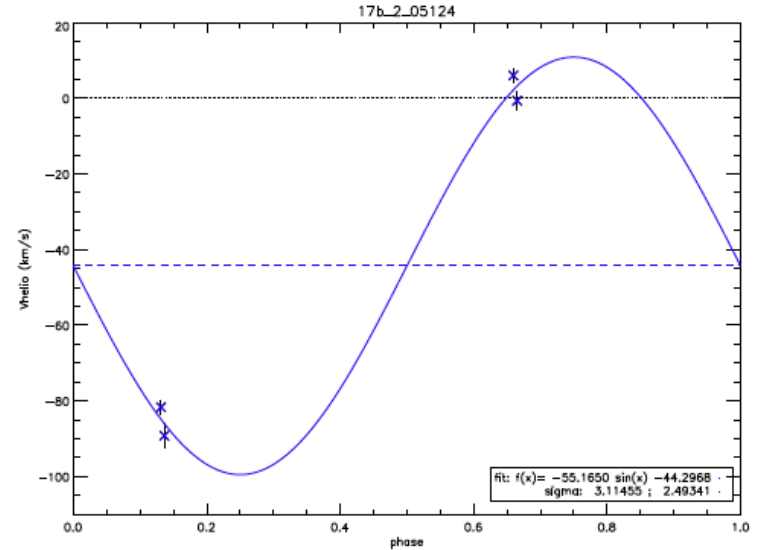
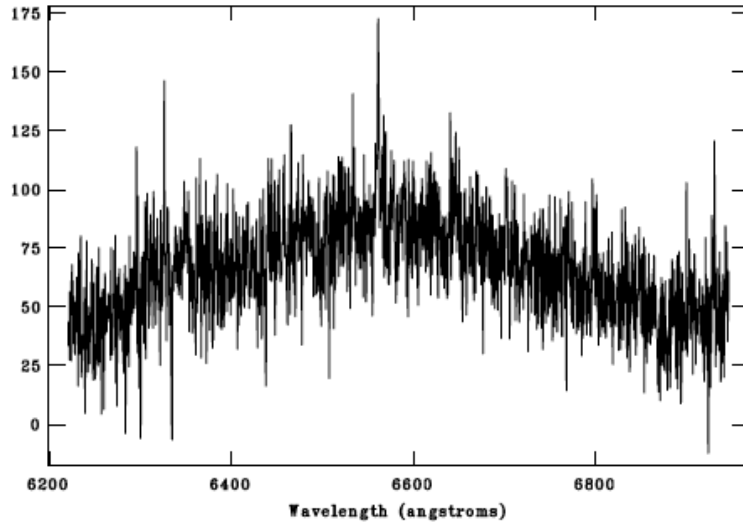
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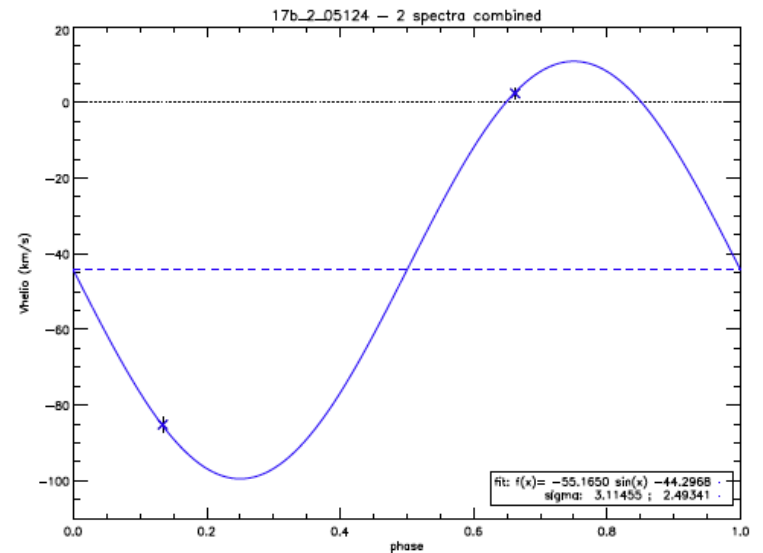
## Next steps

# 17b-2-05124

NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABS-MacBook-Pro-2.local Fri 15:07:23 04-No  
[crup\_0047.wl.fits]: 17b\_2\_05124.2 800. ap:1 beam:1

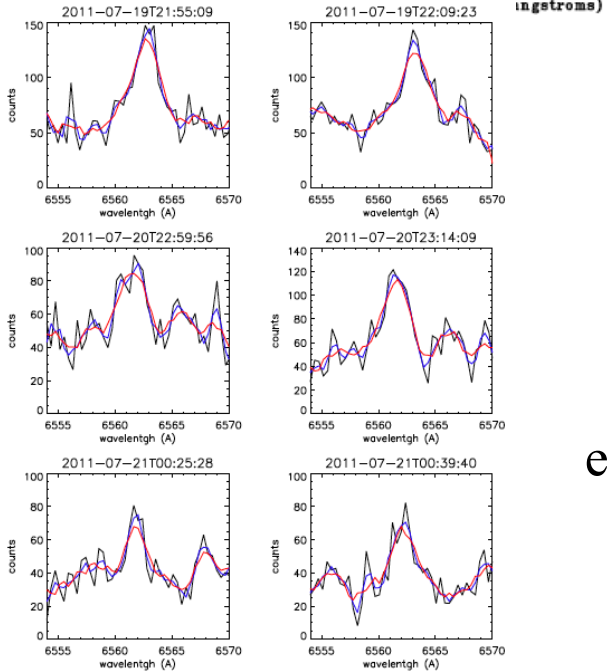
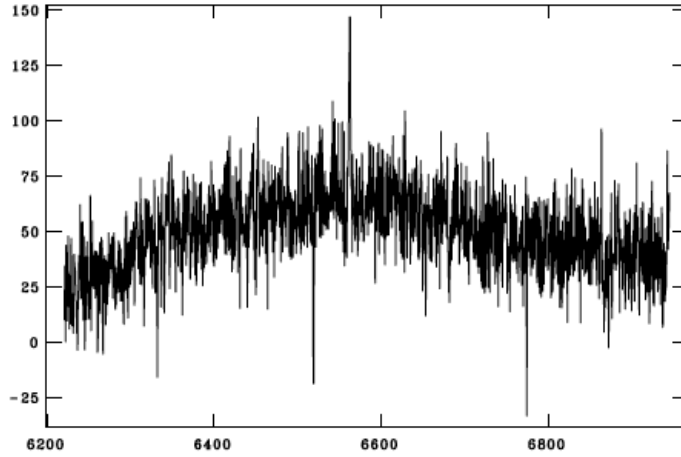


$P = 1.8829$  d  
 $K \sim 55.2$  km/s  
B1 candidate  
mid/late M-dwarf

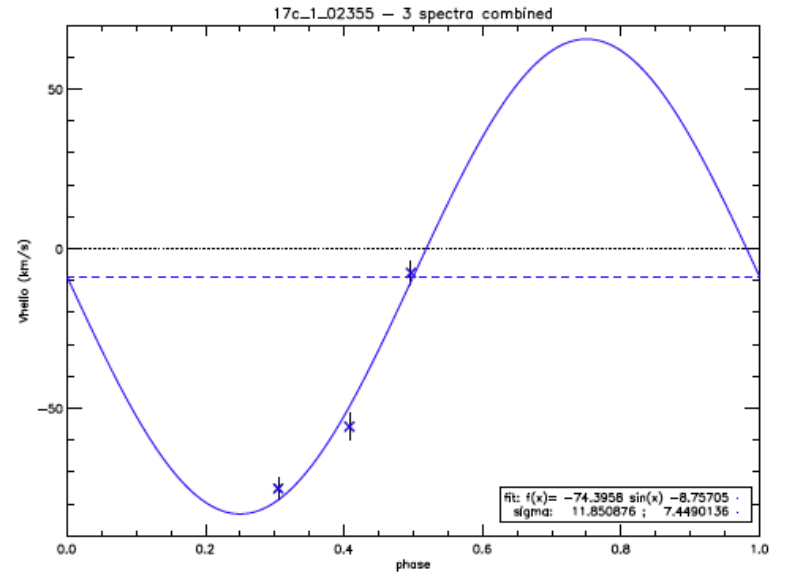
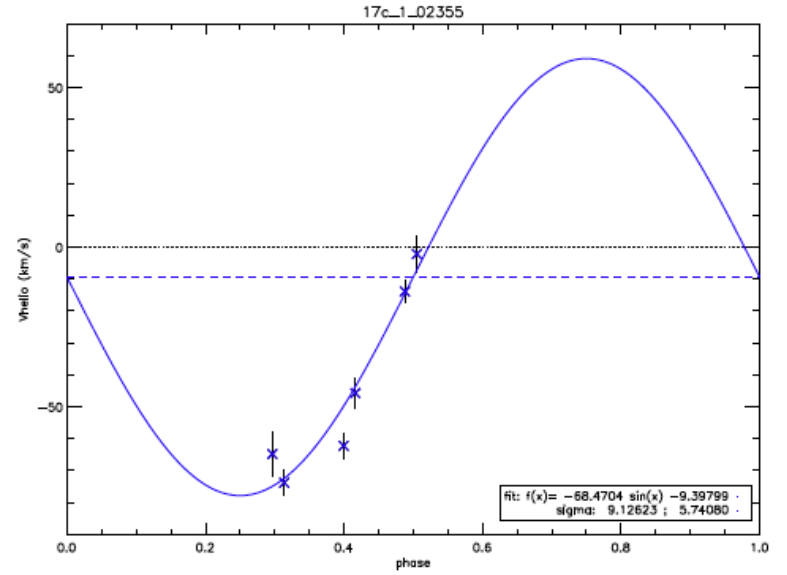


# 17c-1-02355

NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro-2.local Fri 15:02:40 04-Nov  
[cruf\_0038.wl.fits]: 17c\_1\_02355.1 800. ap:1 beam:1



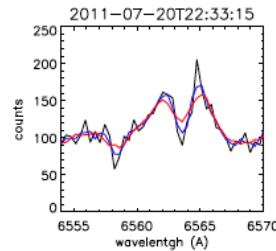
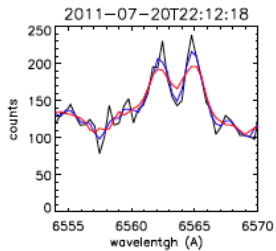
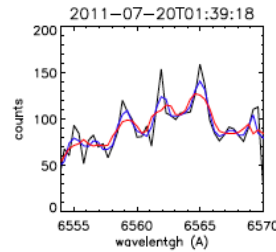
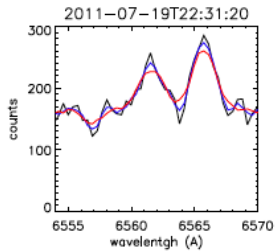
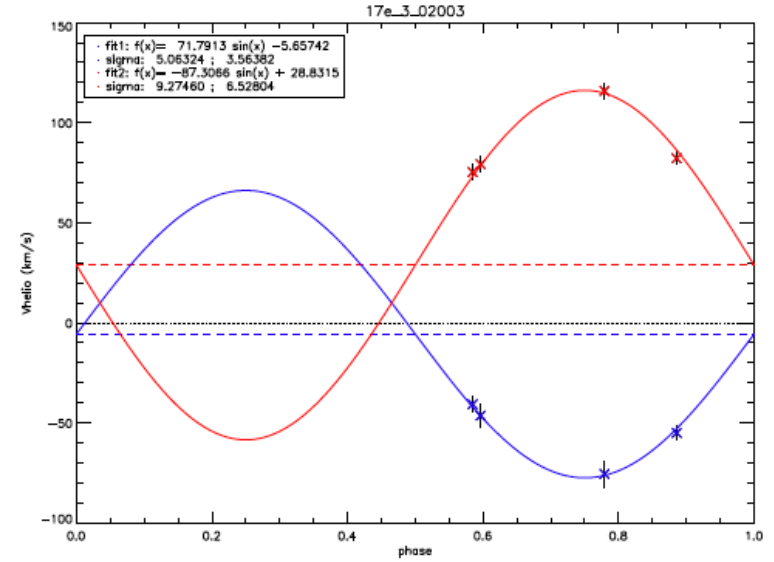
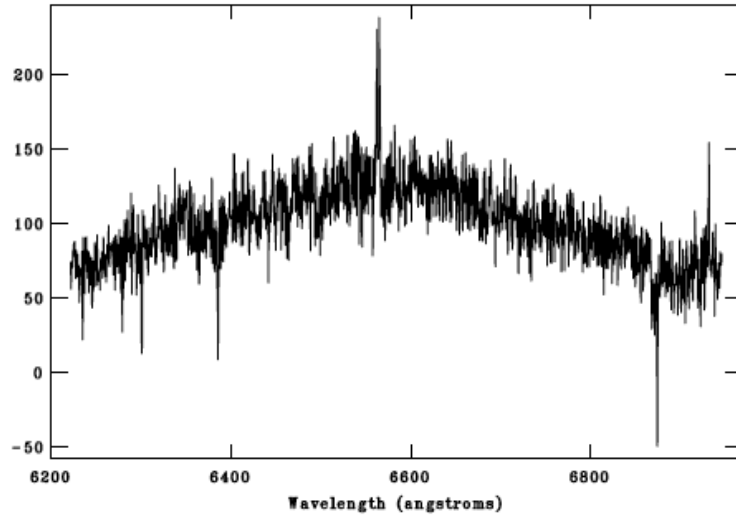
$P = 0.5778$  d  
 $K \sim 68.5$  km/s  
B1 candidate  
early/mid M-dwarf



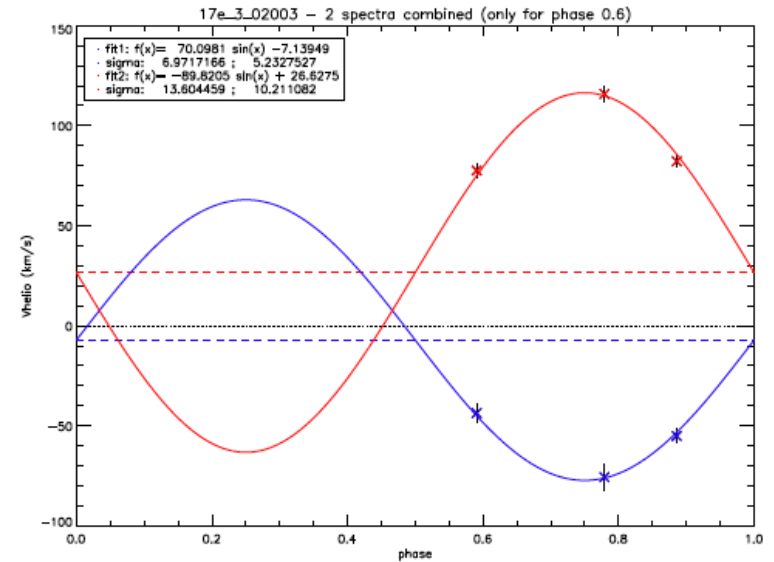


# 17e-3-02003

NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro-2.local Fri 15:12:32 04-No  
[erup\_0040.w1.fits]: 17e\_3\_02003.1 1200. ap:1 beam:1

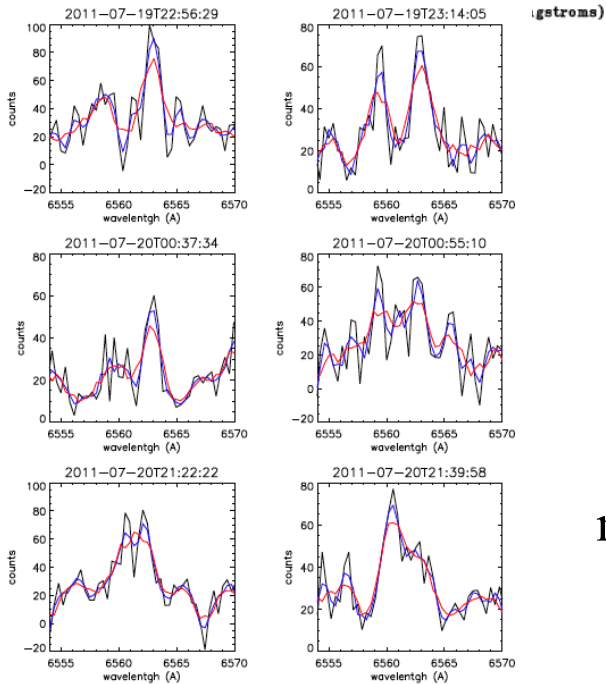
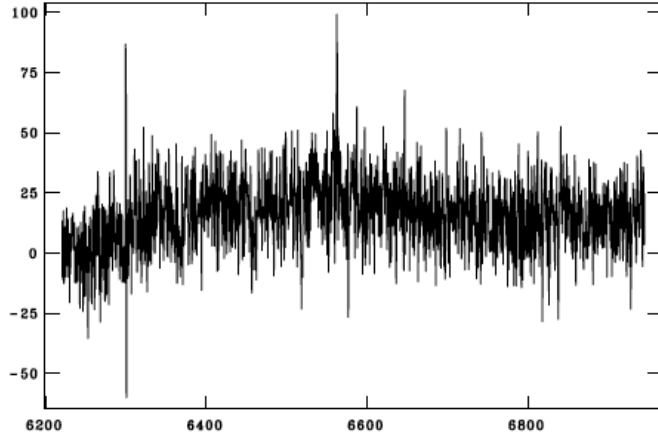


$P = 1.2250$  d  
 $K1 \sim 71.8$  km/s  
 $K2 \sim 87.3$  km/s  
 B1 candidate  
 mid/late M-dwarf

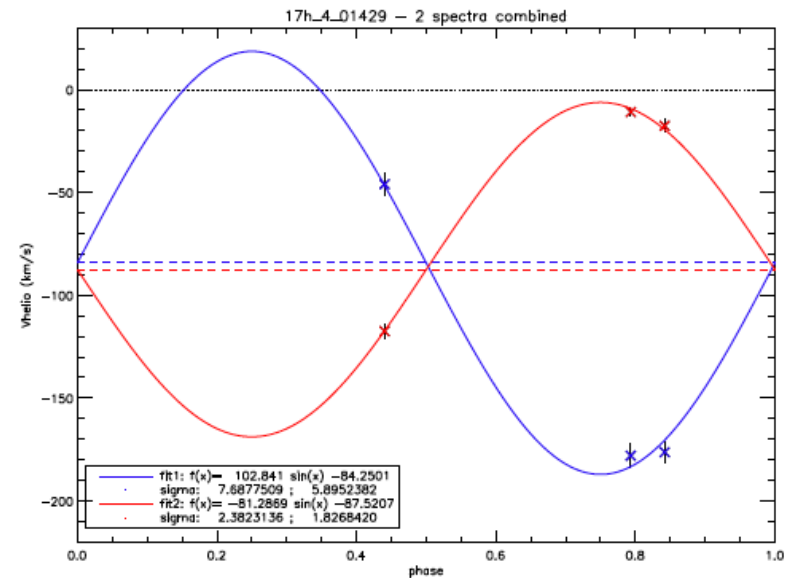
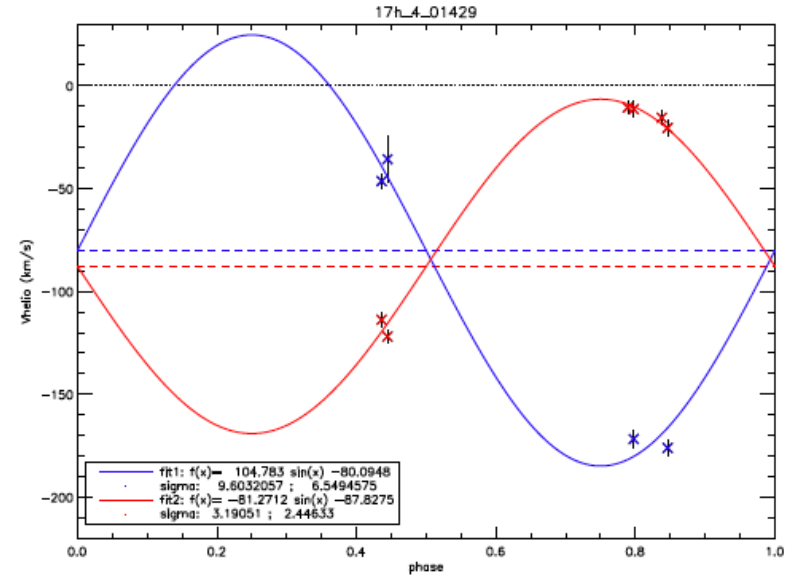


# 17h-4-01429

NOAO/IRAF V2.14EXPORT peruz@LAEFF-CABs-MacBook-Pro-2.local Fri 15:27:43 04-No  
[oruF\_0043.wl.fits]: 17h\_4\_01429.1 1000. ap:1 beam:1



$P = 1.4446$  d  
 $K1 \sim 104.8$  km/s  
 $K2 \sim 81.3$  km/s  
 B1 candidate  
 mid/late M-dwarf



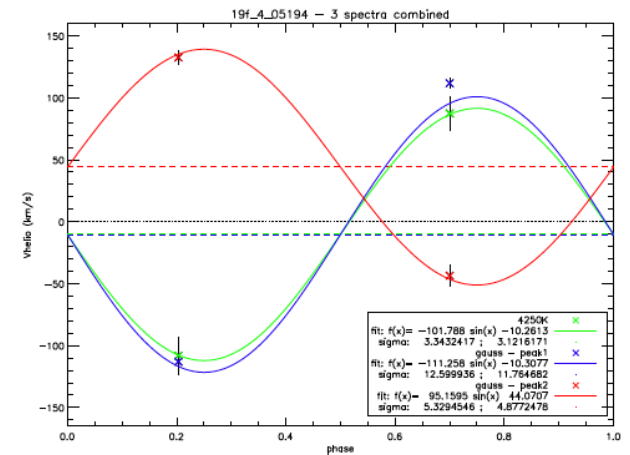
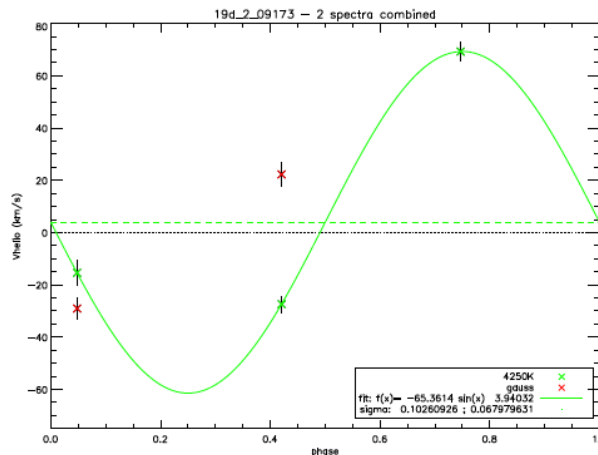
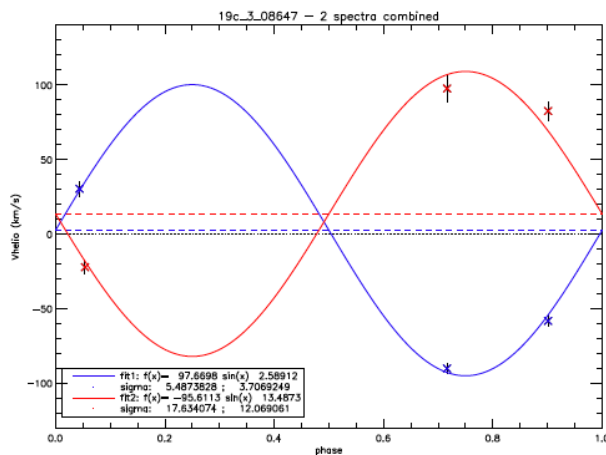
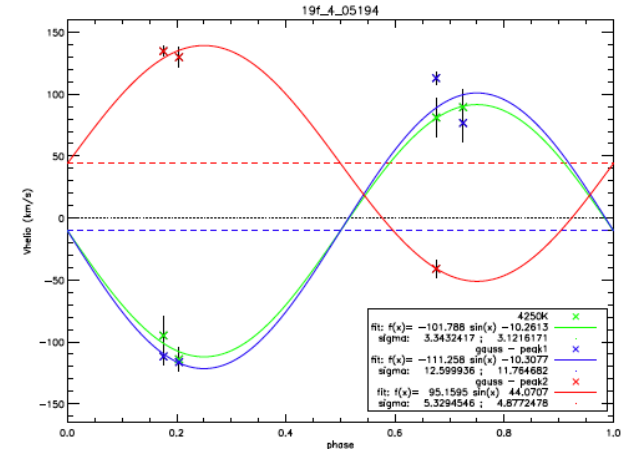
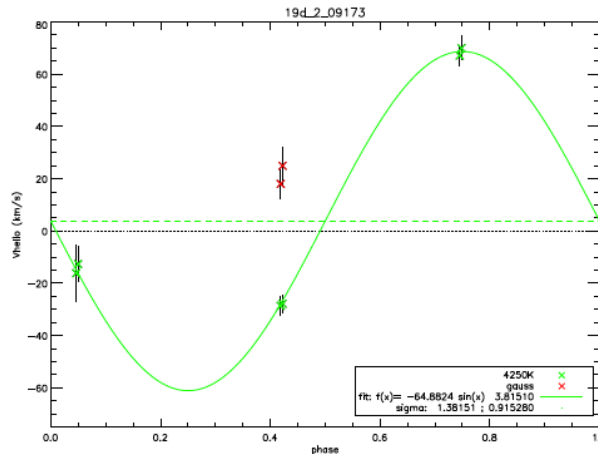
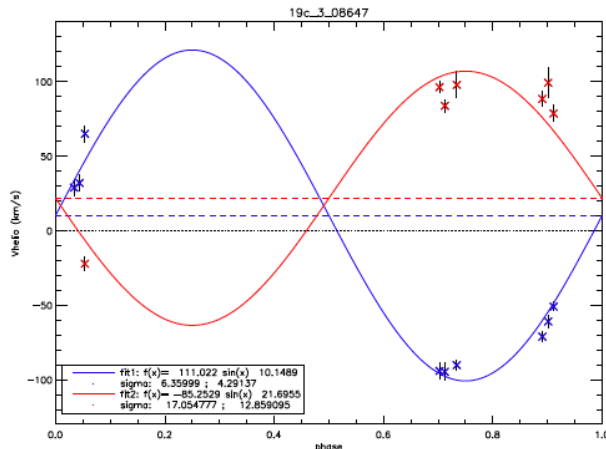
# Overview

## Spectroscopic campaigns at Calar Alto:

- search for false positives: 19c-4-06396 and 19a-4-08320 cases
- EBs from the 17h-field: preliminary results
- EBs from the 19h-field: really recent analysis

Next steps

# 19h-field EBs



$P = 0.8675$  d – early M  
K1 ~ 111.0 km/s  
K2 ~ 85.2 km/s

$P = 3.3455$  d – late K  
K1 ~ 64.9 km/s  
K2 ~ ?

$P = 0.5895$  d – late K  
K1 ~ 101.8; 111.3 km/s  
K2 ~ 95.2 km/s

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- EBs from the 19h-field: really recent analysis

**Next steps**

# Next Steps

## Spectroscopic analysis:

- Report on the 17h and 19h EBs
- Solve the binary systems properly: FITSB2

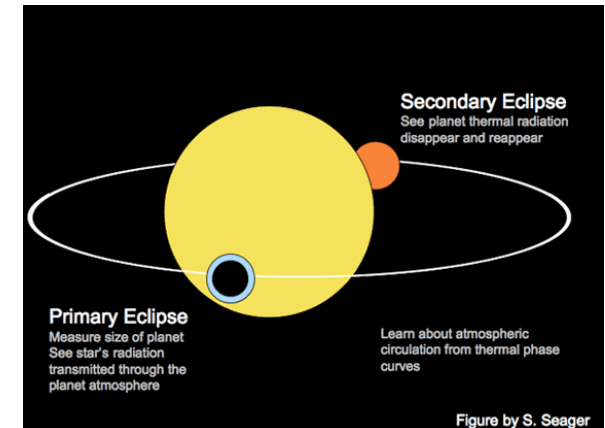
(R. Napiwotzki et al., 2004)

## Low-res spectra:

- Finalize the characterization of ~30 candidates.

## Detecting planetary light:

- Analyse secondary transit data taken with OMEGA2000 at Calar Alto.



***Thank you***

