Stellar Activity in the Open Cluster IC4756

CoRoT Week 11 Tenerife

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   - STELLA/WiFSIP Photometry
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- calibrate models (Barnes, 2010; Barnes&Kim, 2011)

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- average cluster velocity -25.15 kms^{-1}
  (Mermilliod et al., 2008)

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- STELLA/WiFSIP photometry $\Rightarrow$ color-magnitude diagram

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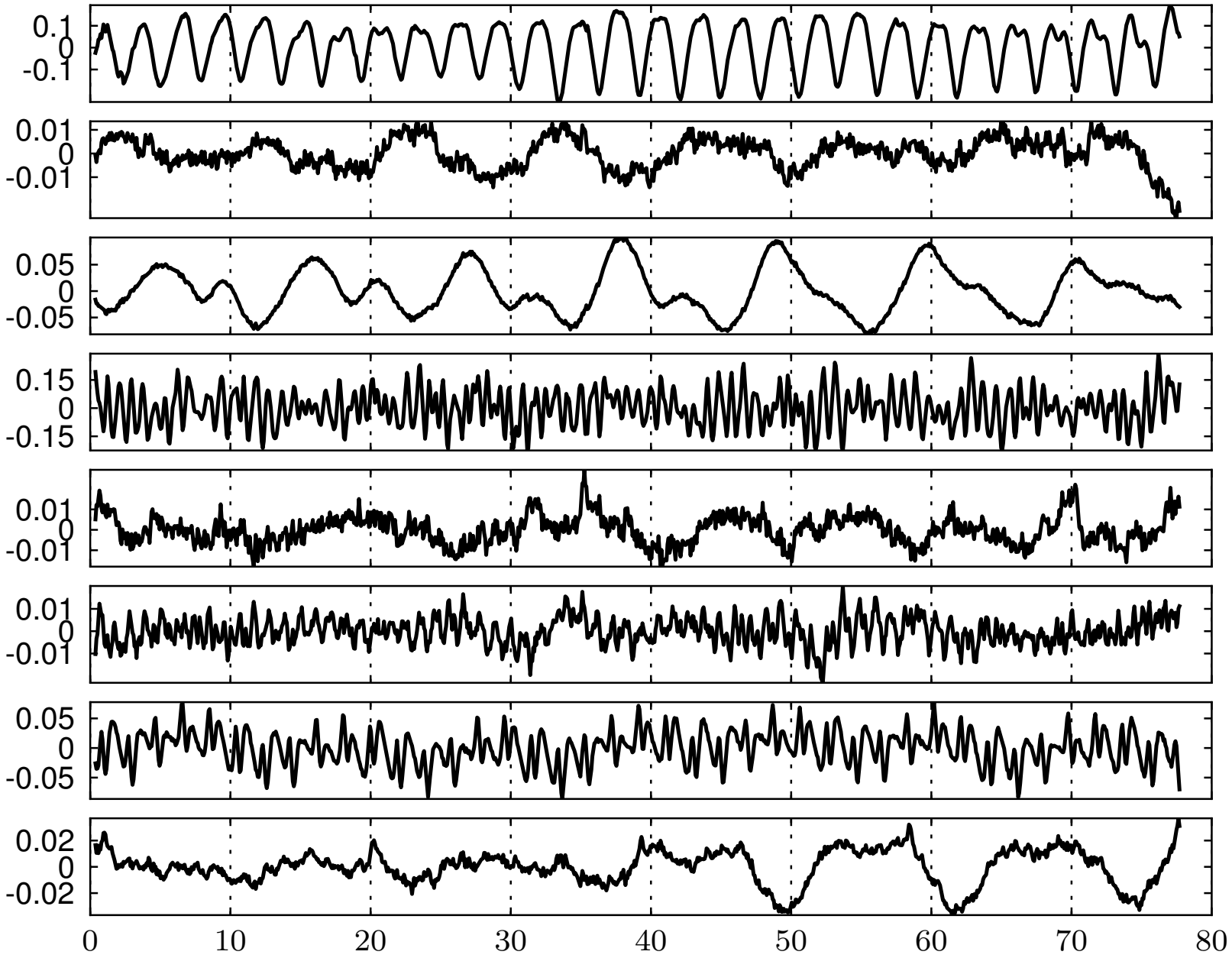
- 5 targets observed in imagette mode


0.1
0
-0.1
0.01
0
-0.01
0.05
0
-0.05
0.15
0
-0.15
0.01
0
-0.01
0.01
0
-0.01
0.05
0
-0.05
0.02
0
-0.02
0
10
20
30
40
50
60
70
80

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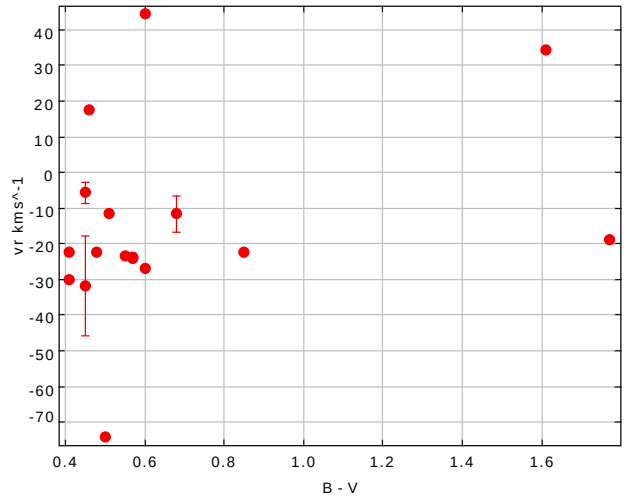
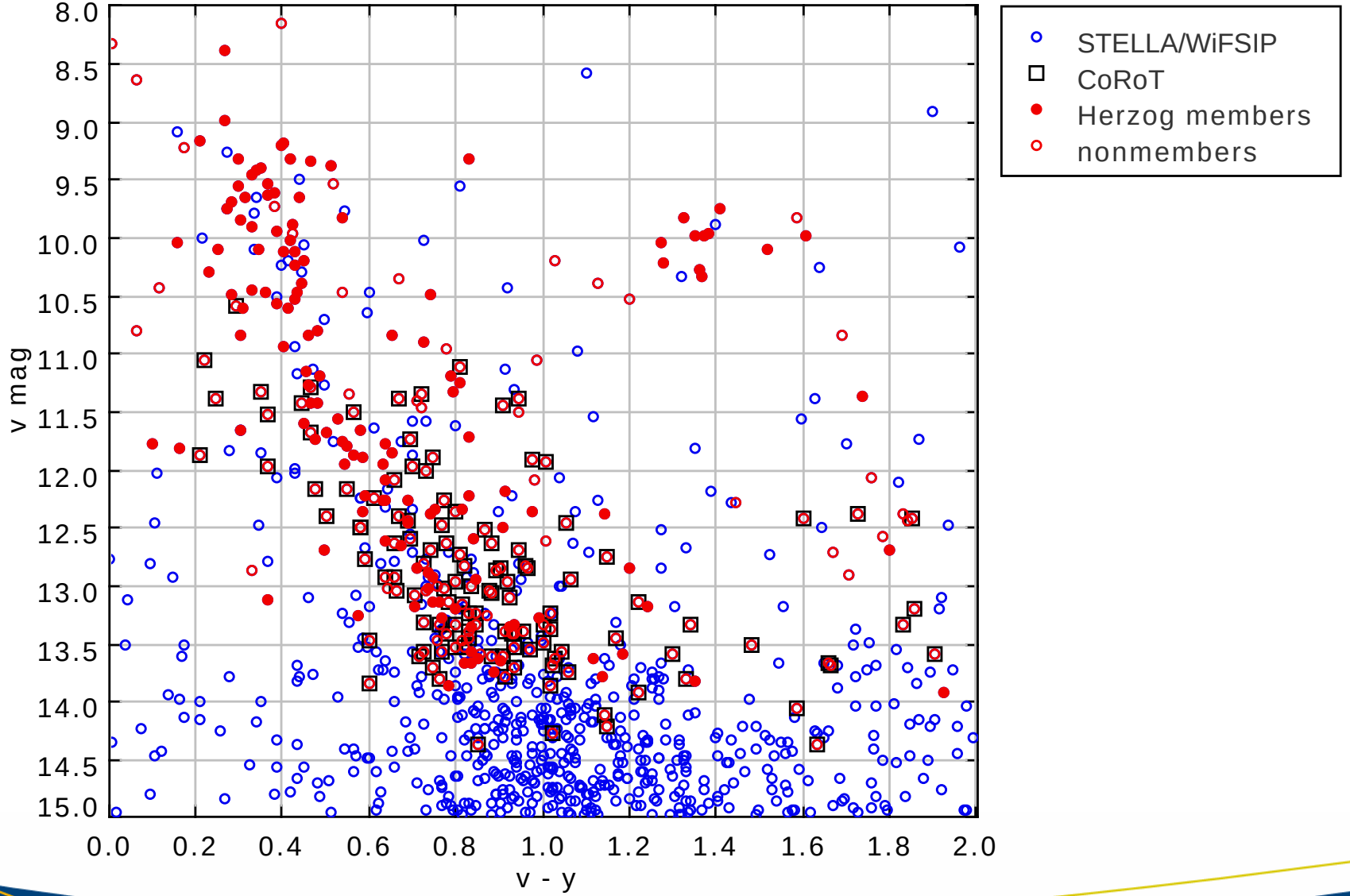
- 19 stars measured

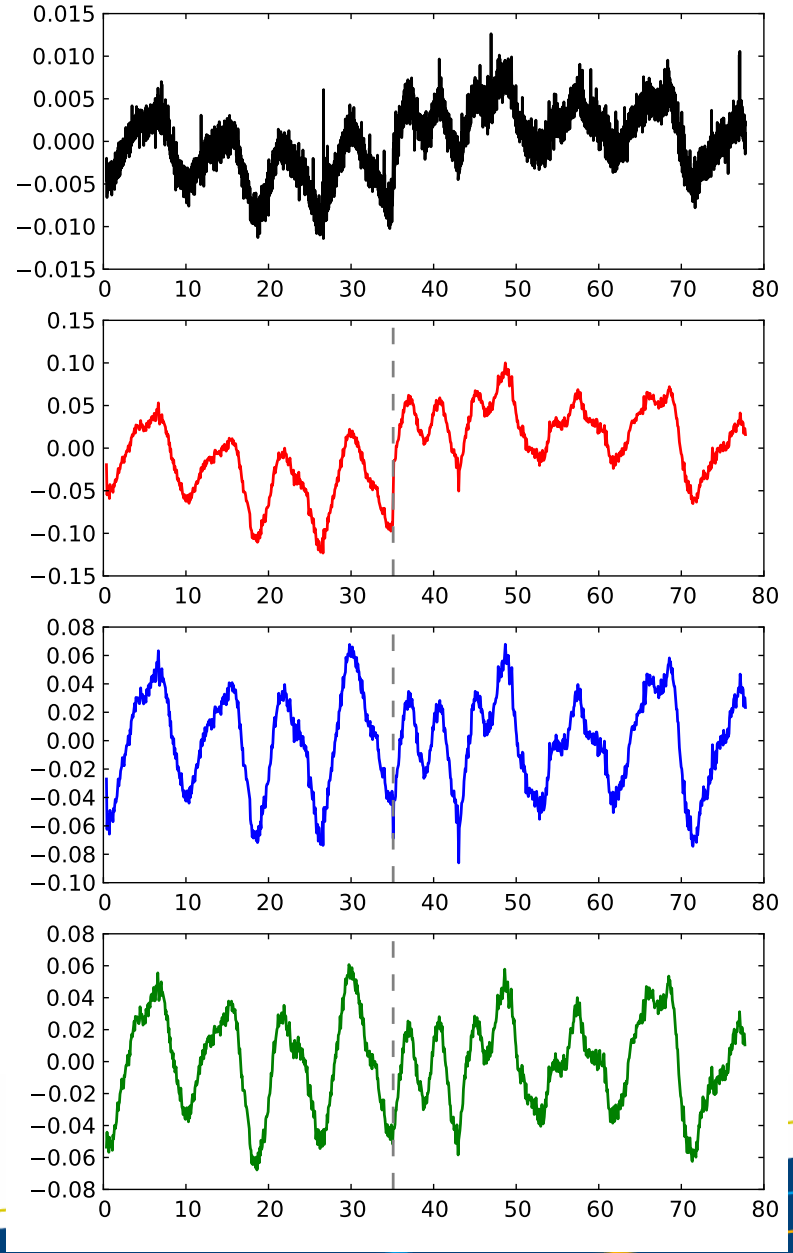


STELLA/WiFSIP Photometry



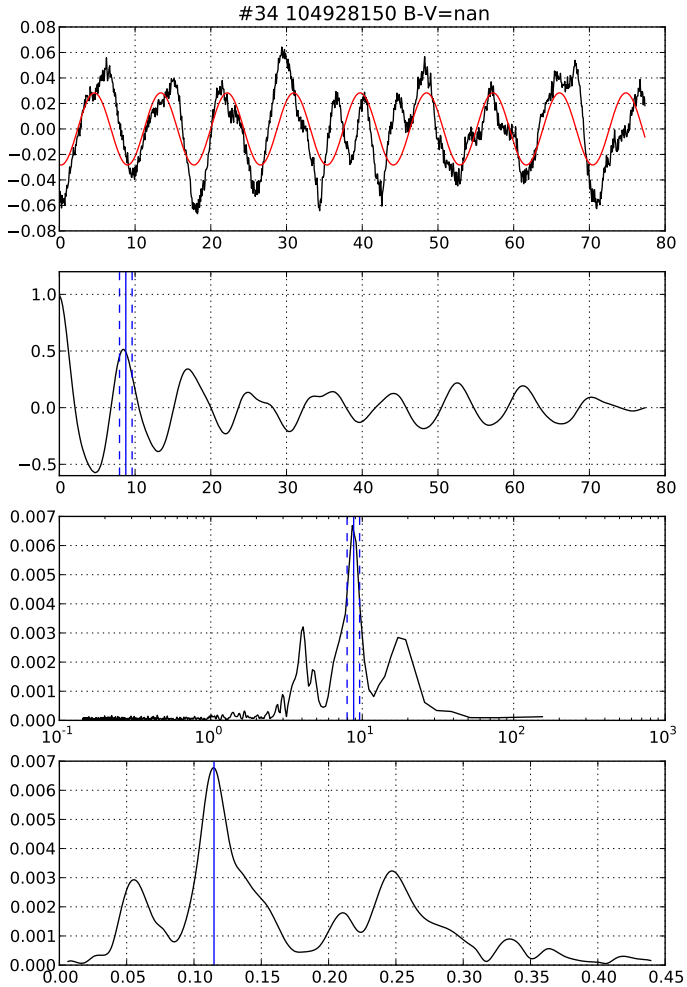
CoRoT Data Reduction

1. remove flagged data from whiteflux
2. down-sampling from 32s to 512s
3. interpolation of missing data $\Rightarrow$ 12,288 equally spaced measurements
4. correct for jump in HJD 2455420.5786
5. remove linear trend
6. perform σ-clipping on finite differences
7. apply low-pass with cut-off at 7 cpd



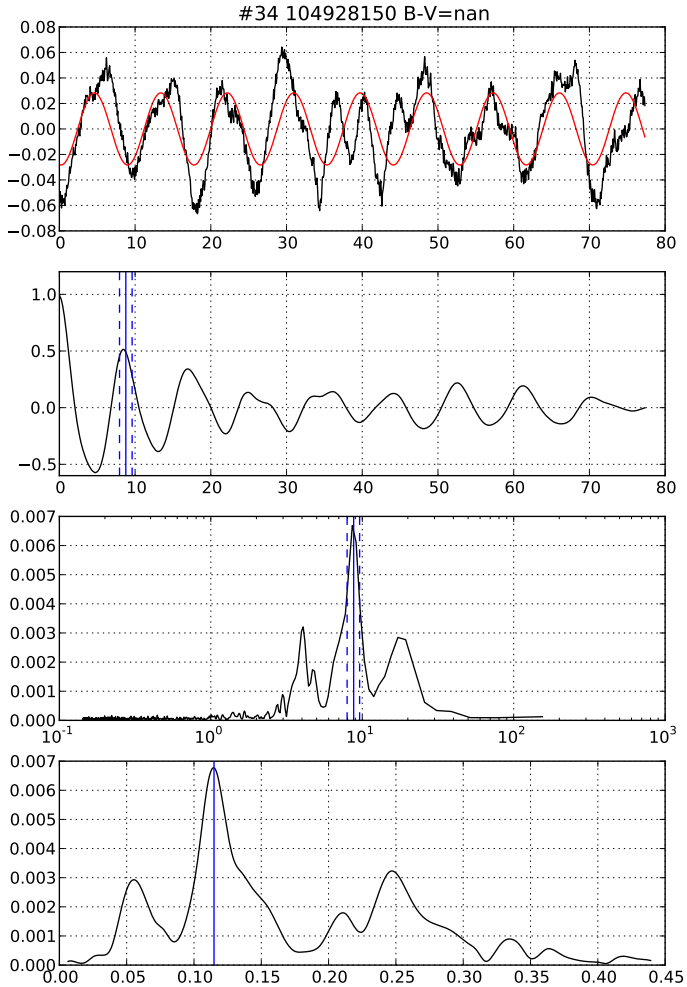
Measurement of rotation periods

1. maximum of autocorrelation



Measurement of rotation periods

1. maximum of autocorrelation
2. determine maximum in Fourier periodogram



Measurement of rotation periods

1. maximum of autocorrelation
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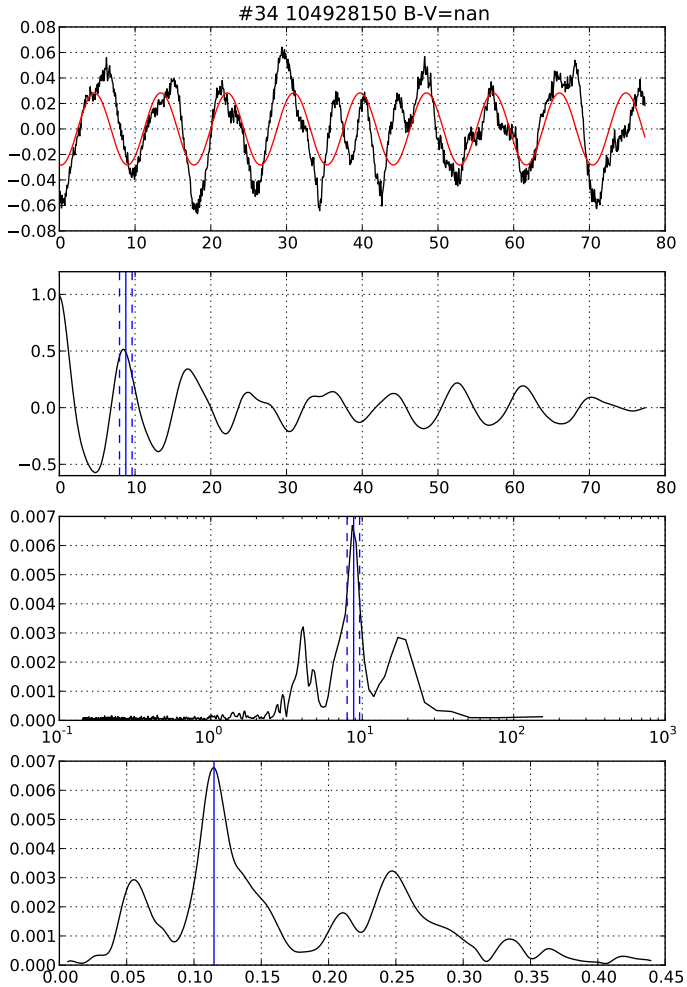
3. check if agreement with autocorrelation



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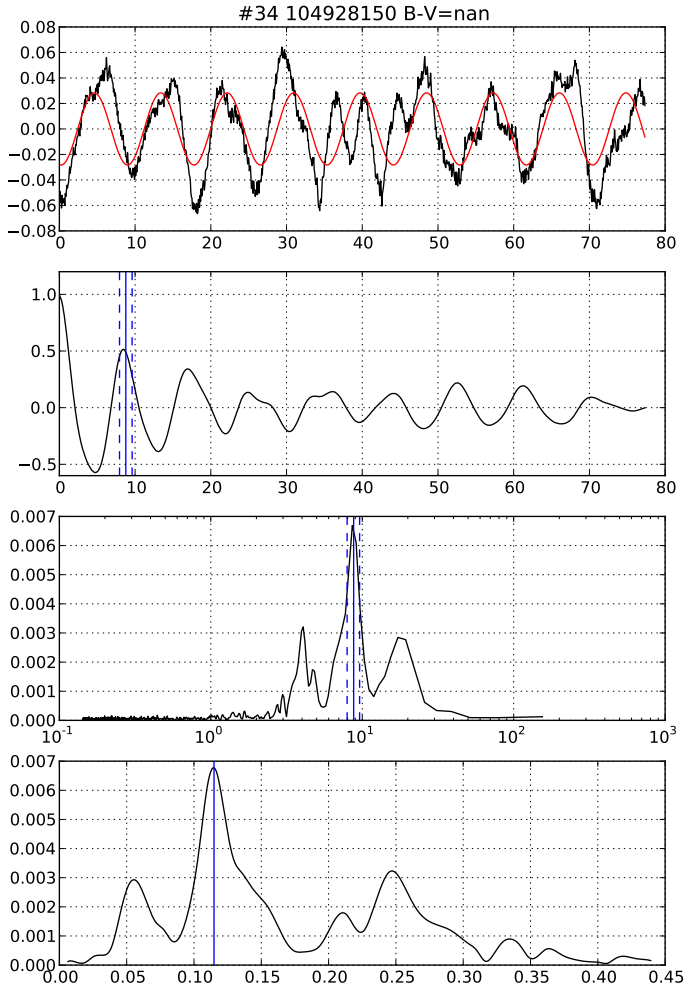
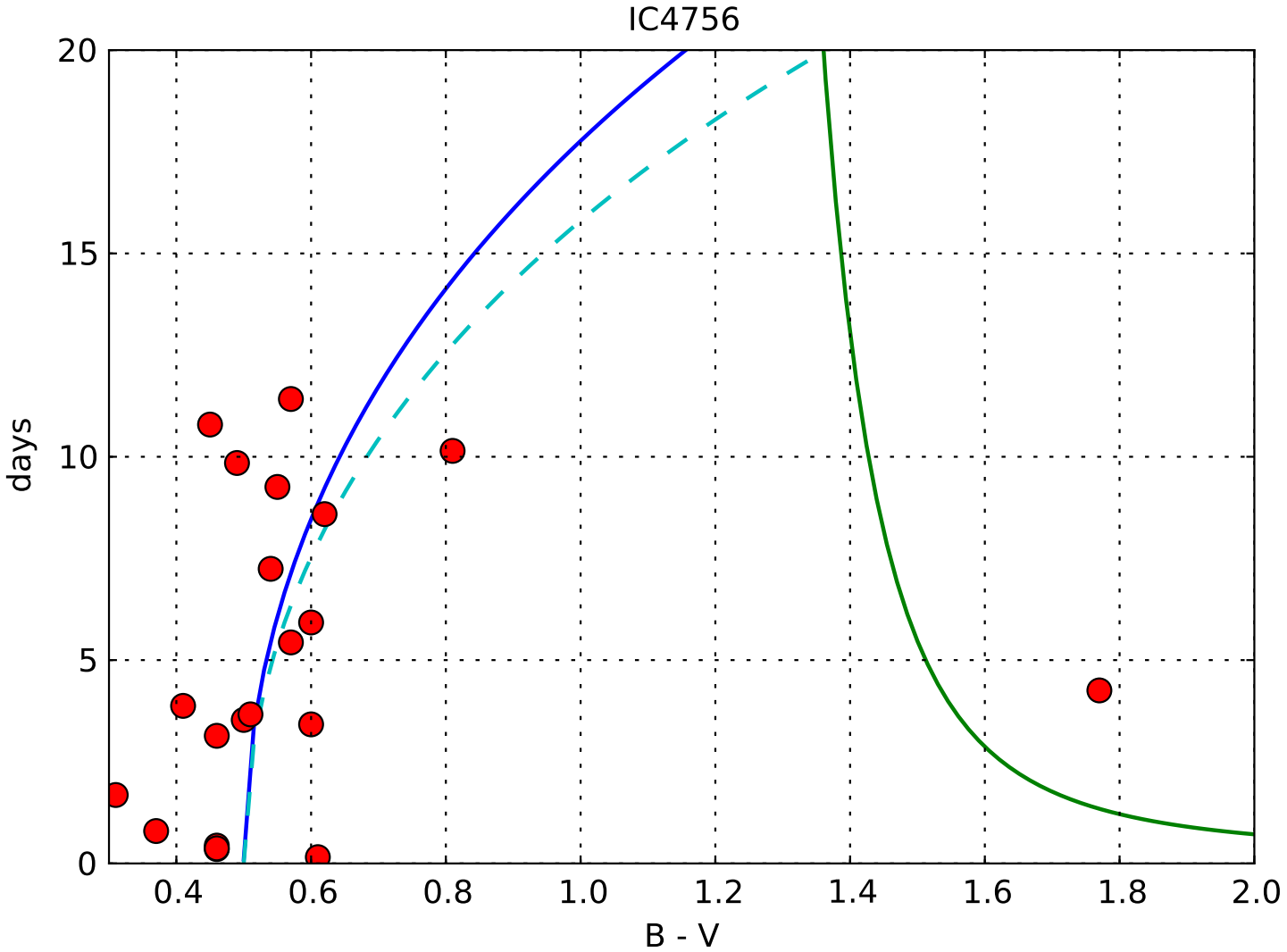
4. apply cosine-fit to verify correct period and amplitude



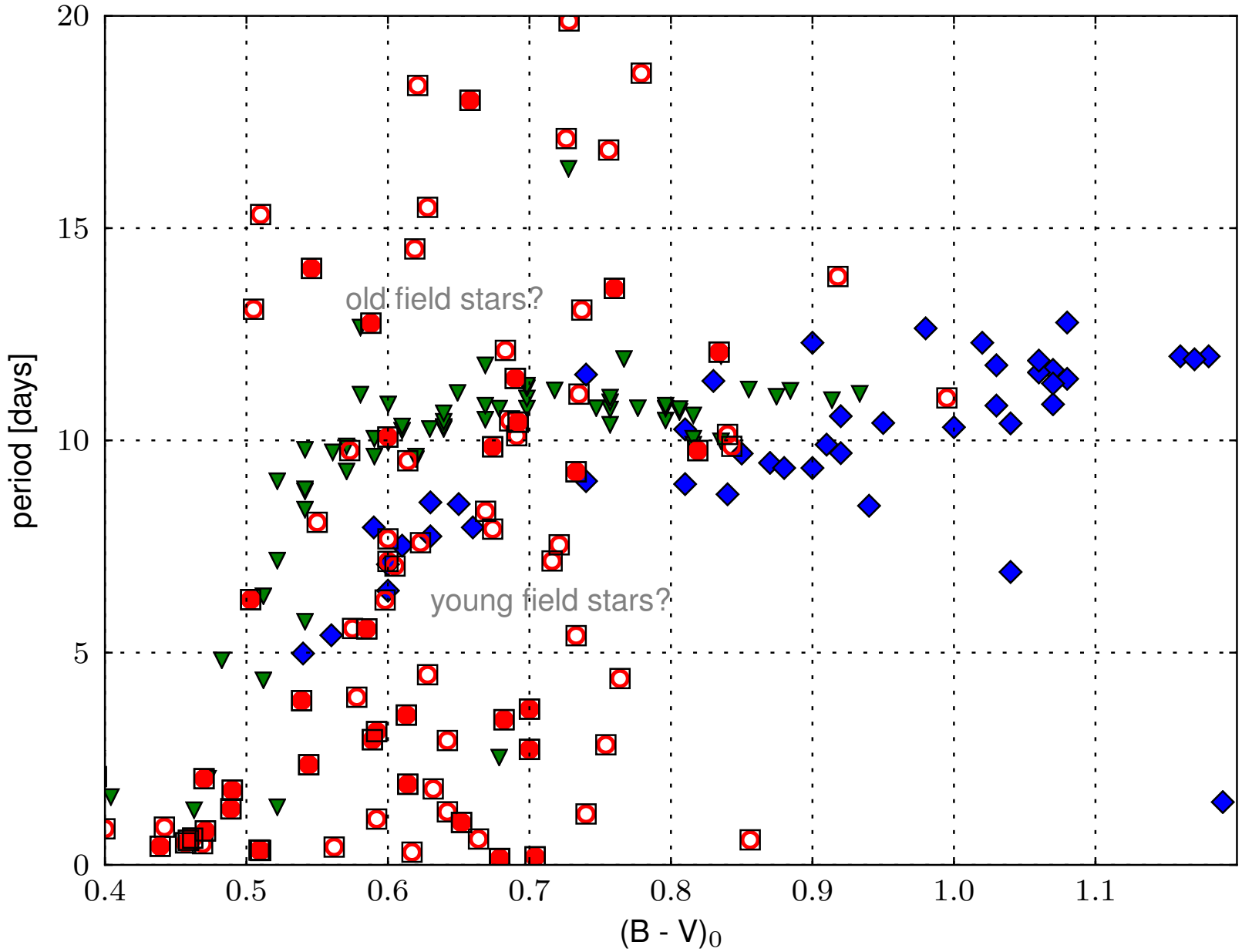
Rotation Periods in IC4756



Differential Rotation

Table: CoRoT targets within the cluster that show signatures of differential rotation in the Fourier periodogram.

CoRoTID	$P_{\rm rot}$	$\Delta\Omega/\Omega$
104885763	8.74	0.15
104925676	1.76	0.046
105112517	3.39	0.06
105136898	3.17	0.09
105227823	3.68	0.12
105165044	9.45	0.12


20
15
10
5
0
period [days]
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
(B - V)0
old field stars?
young field stars?

Discussion & Conclusions

- cluster might be younger than previously measured
- amplitudes lower than expected
- differential reddening clutters the color-period diagram
- one flaring star: CoRoTID 104885763
- one pulsator: CoRoTID 105137398
- 17 stars with rotation signatures

Future work:

- 111 CoRoT targets identified as cluster members
- STELLA/WiFSIP photometry: c_1, m_1, H_β, de-redden
- multi-object spectroscopy