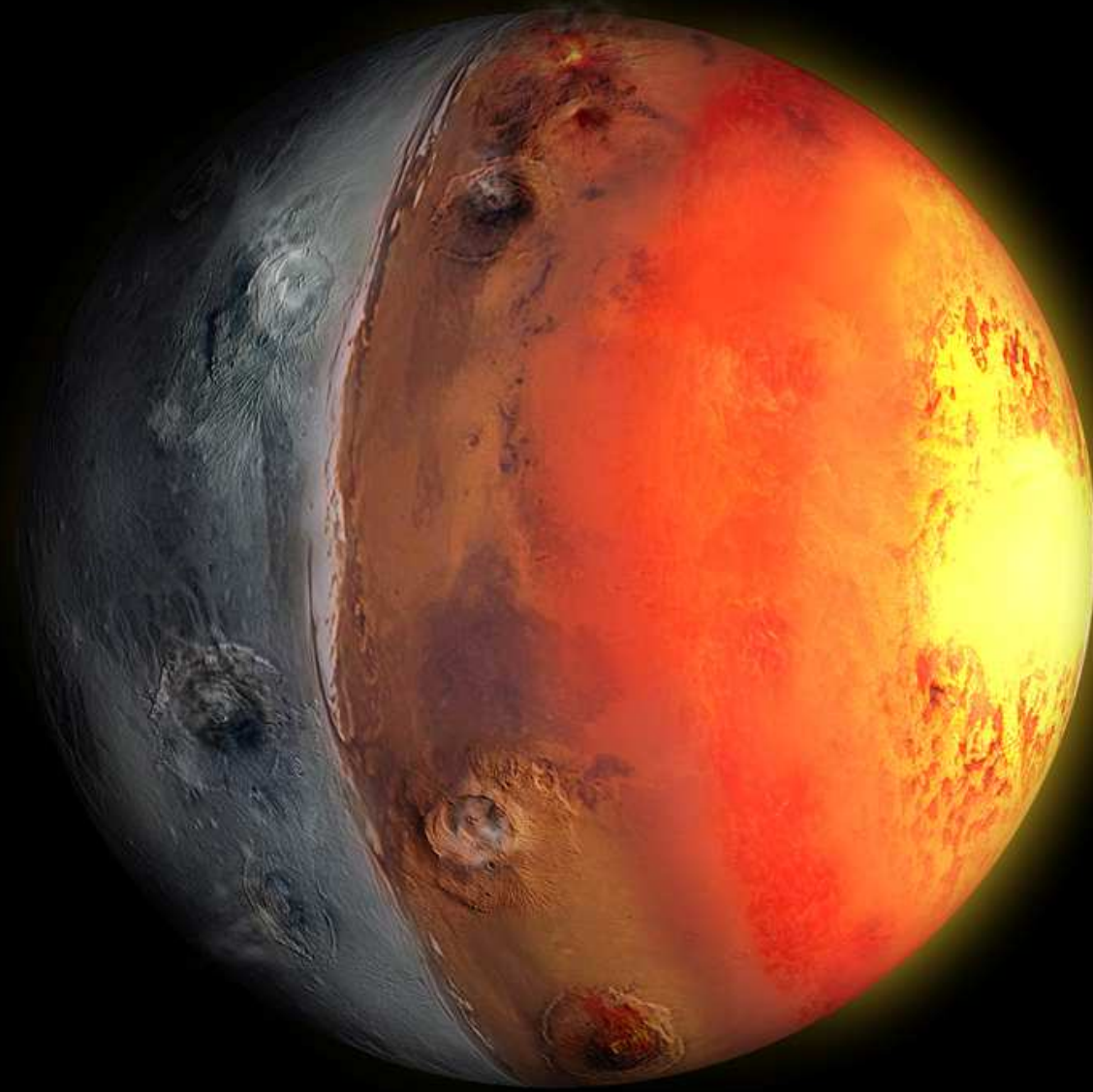


La Plata 26.2.2010

**CoRoT 7b+7c**

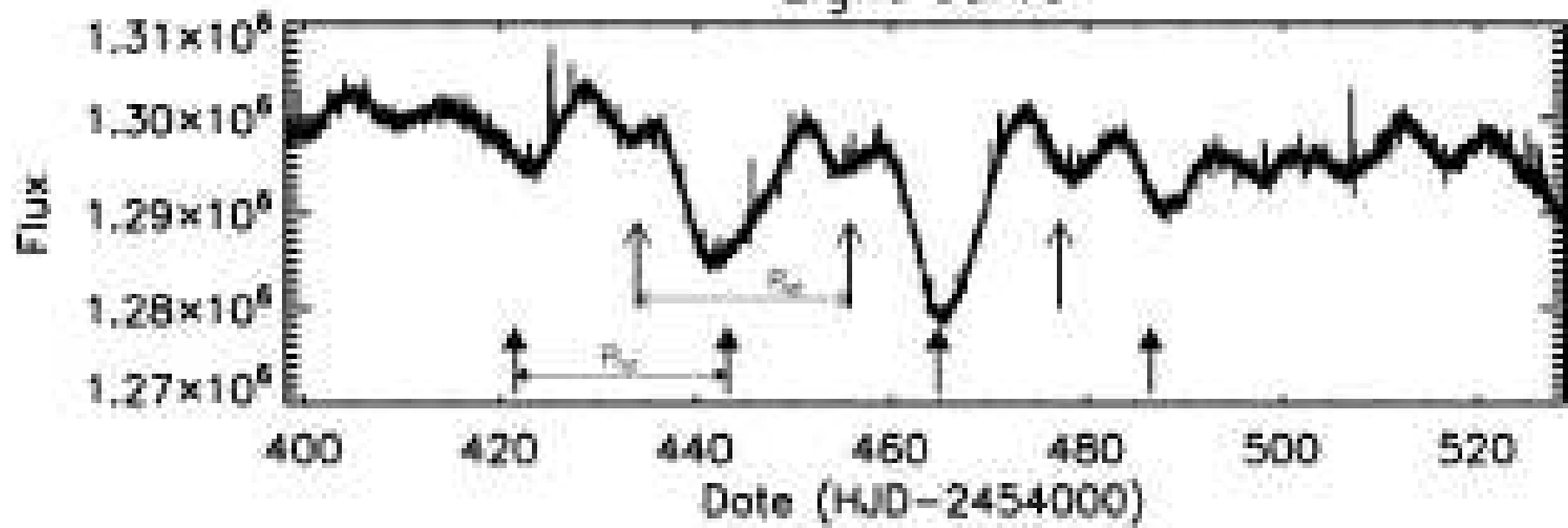
**Mass and Orbital Elements**

# Artist view

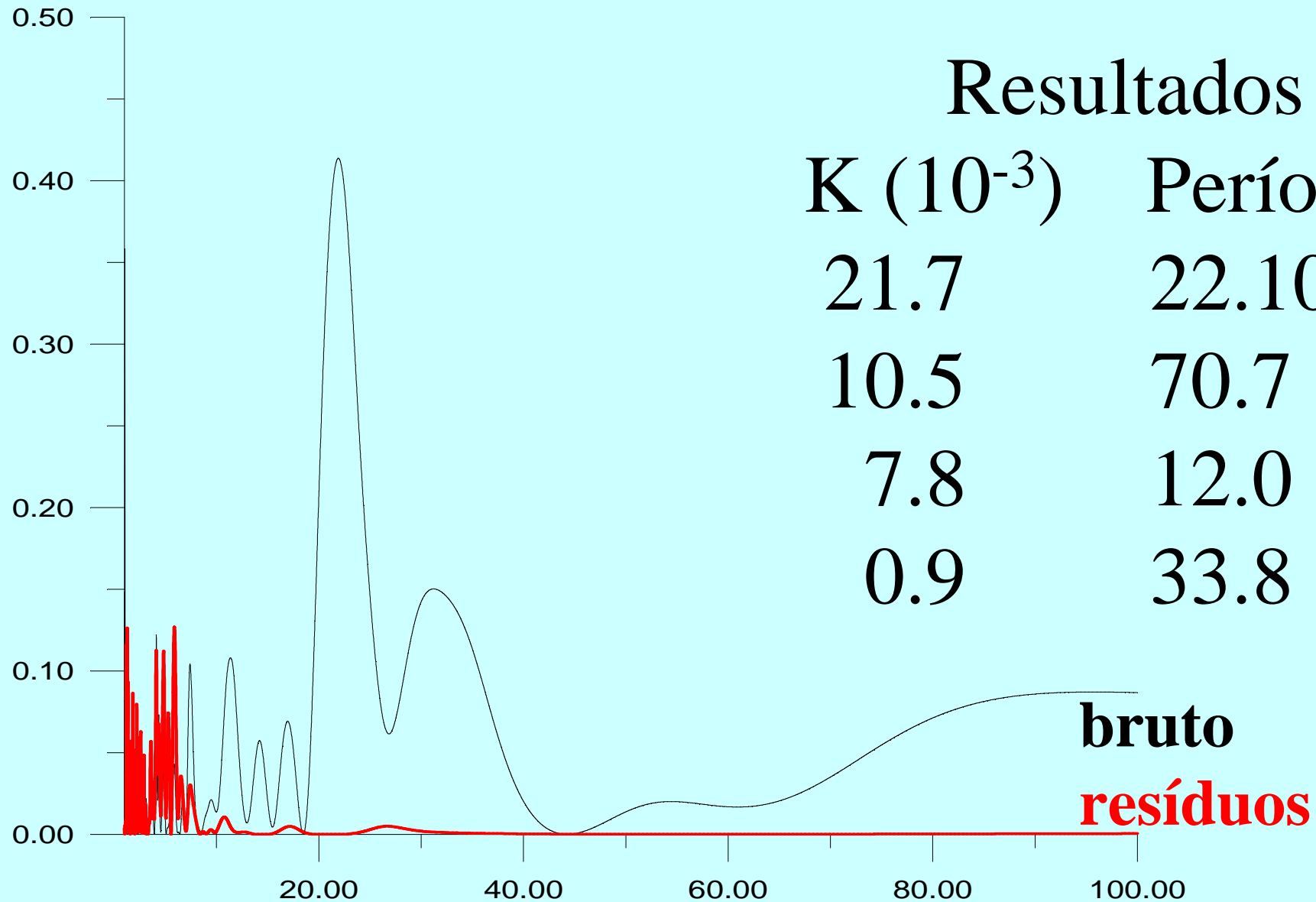


2600 K

Light curve



# Indicador ( $r_{hk}$ ) de atividade cromosférica

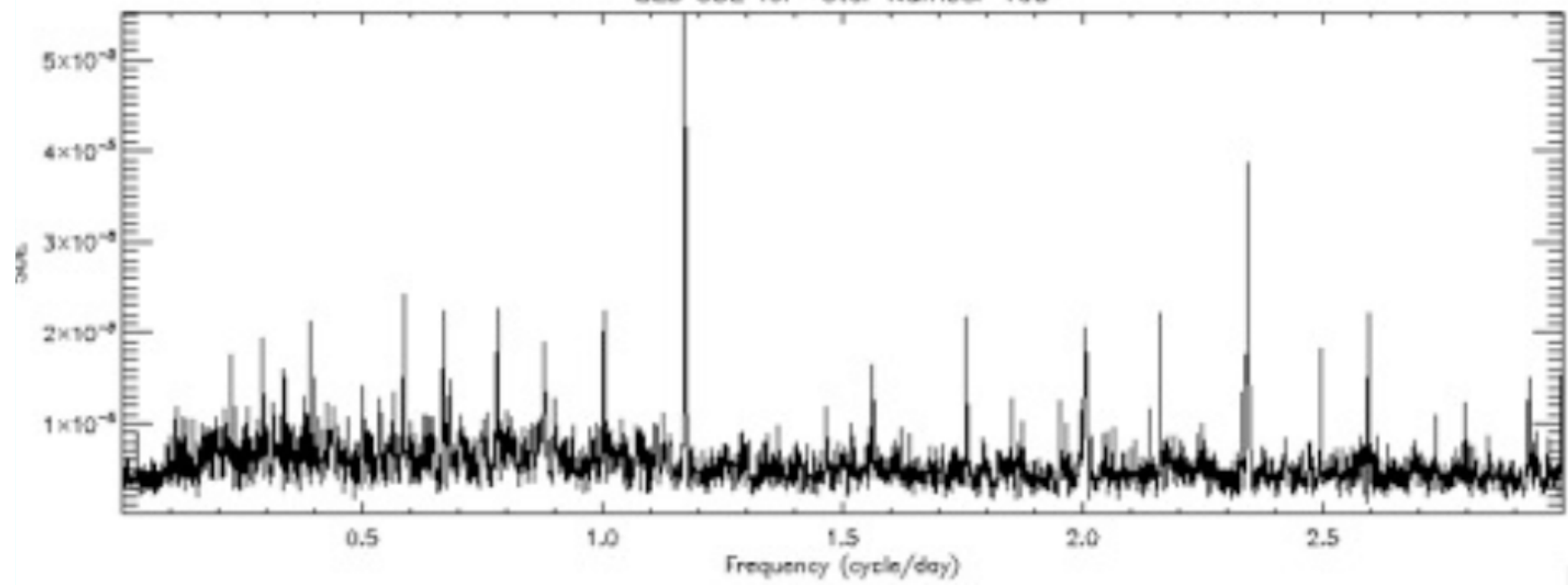


## Resultados

K ( $10^{-3}$ )	Período (d)
21.7	22.10 d
10.5	70.7
7.8	12.0
0.9	33.8

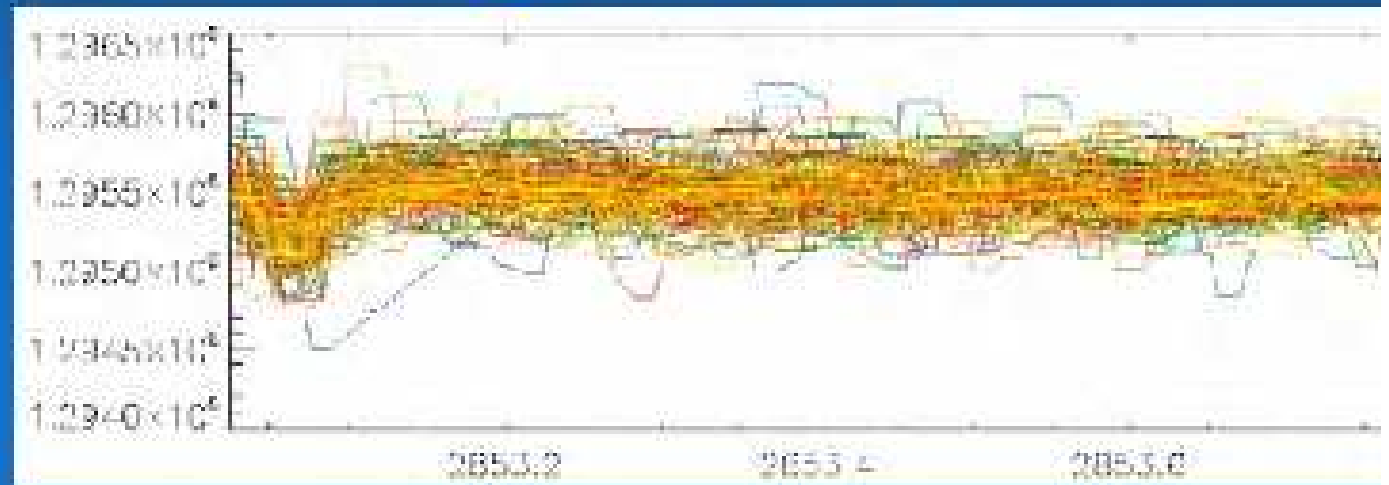
**bruto**  
**resíduos**

BLS SDE for Star Number 165

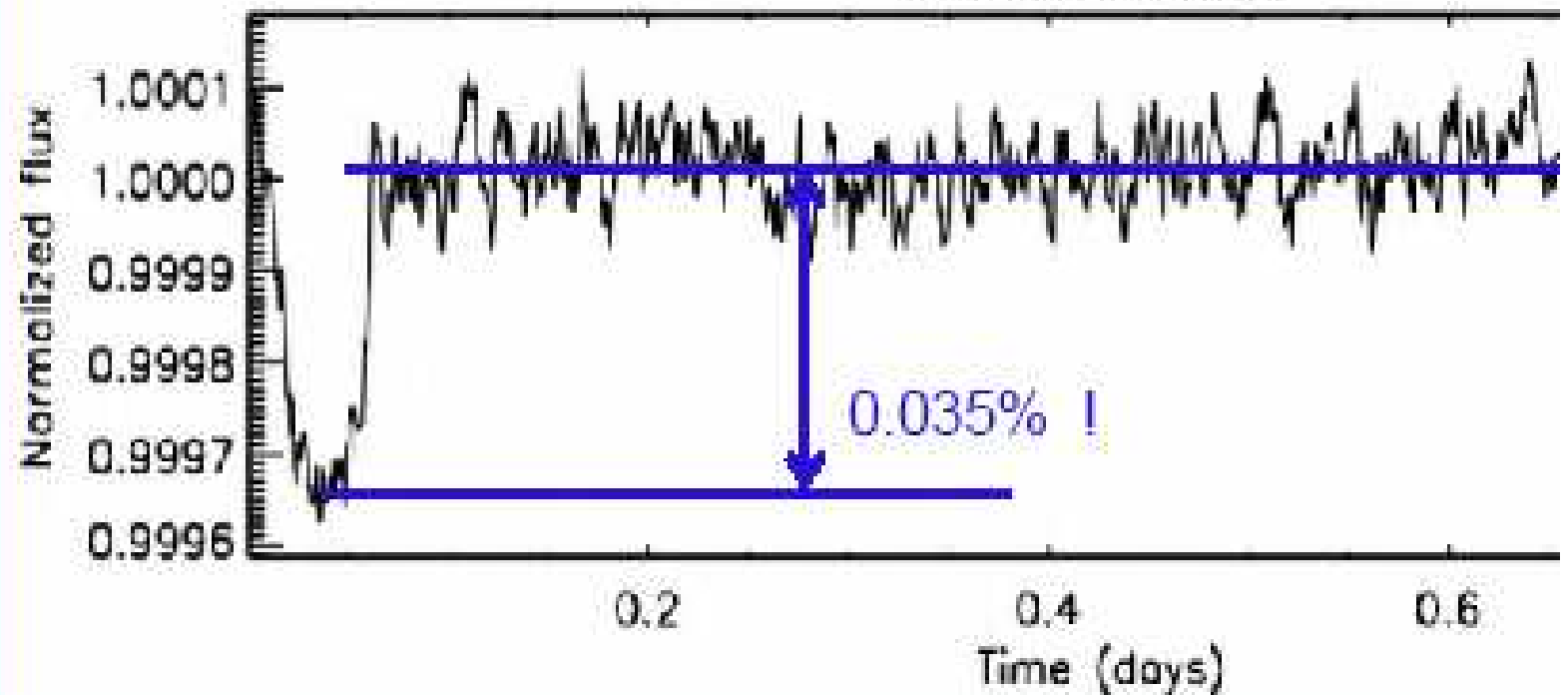




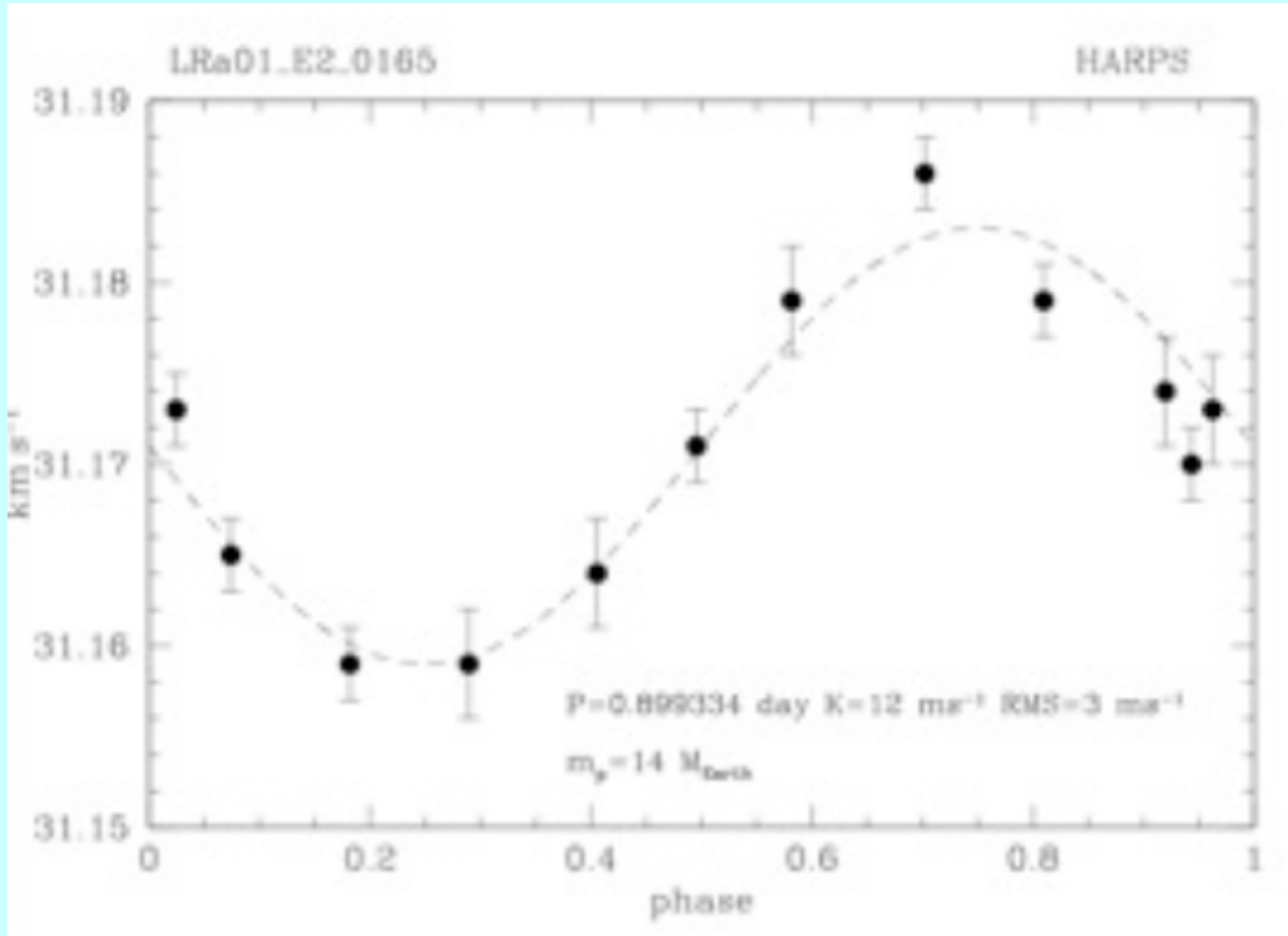
# The folded light curve



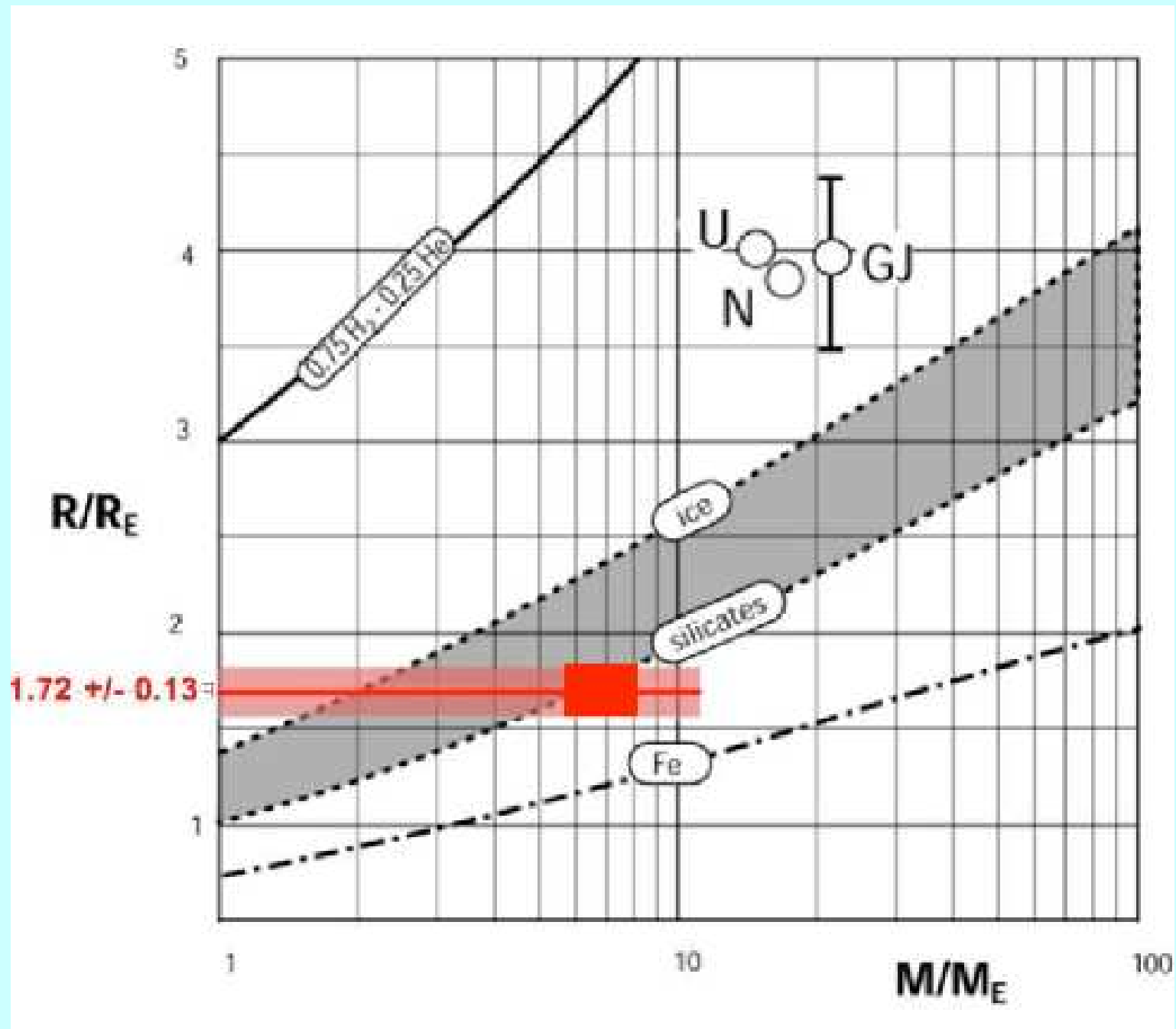
Transit average



# Early RV measurements (HARPS)

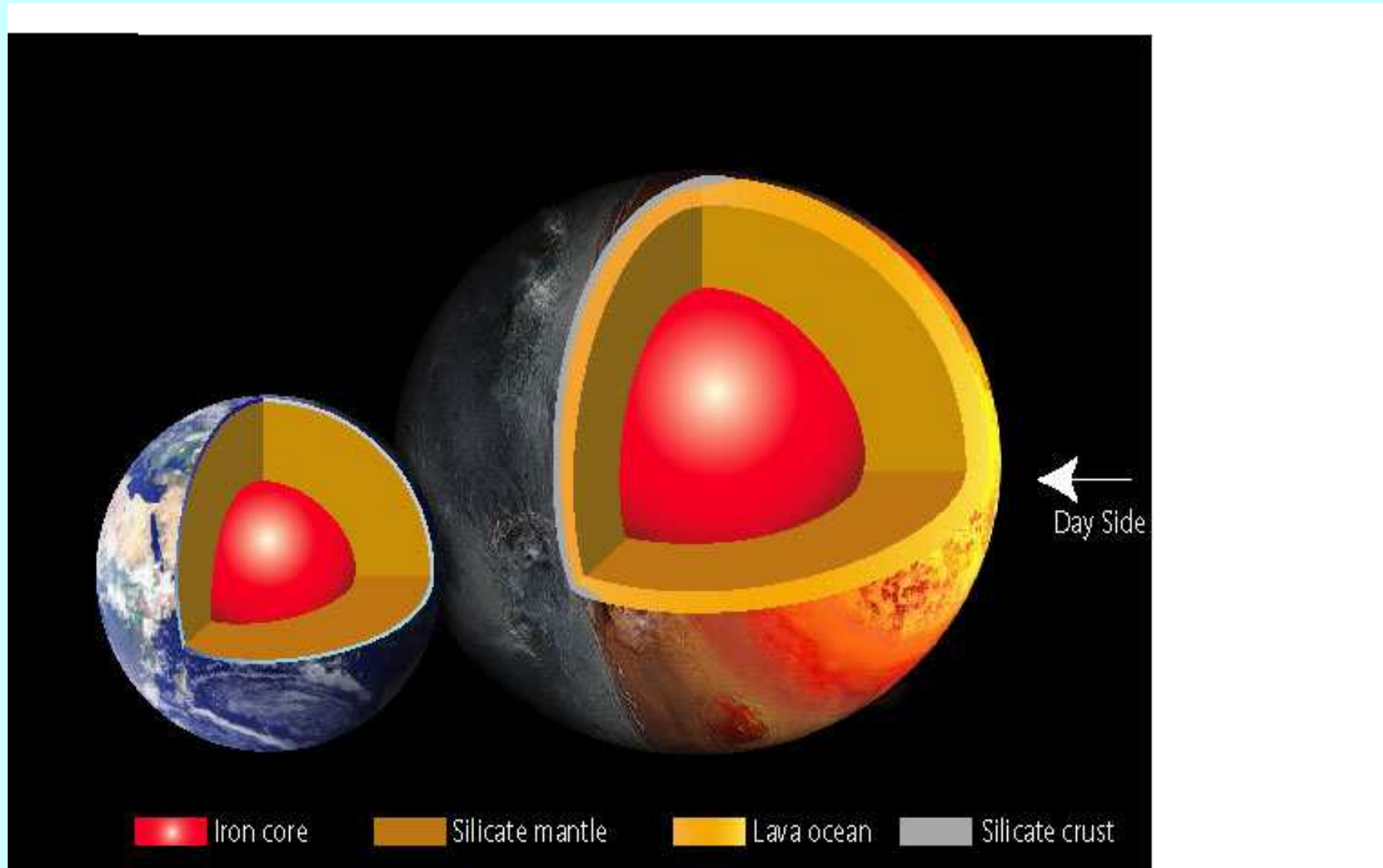


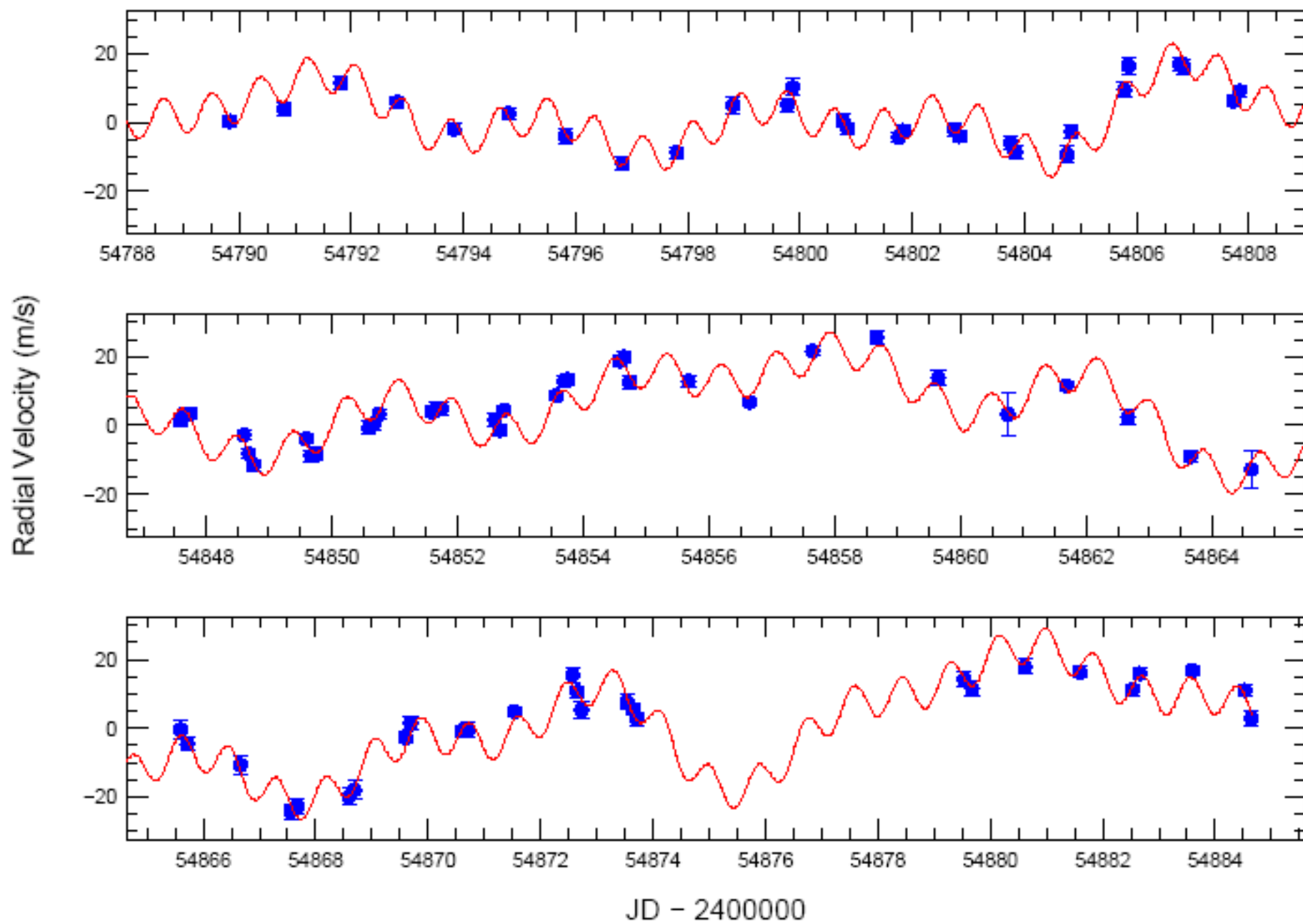
# Structure of Corot-7b



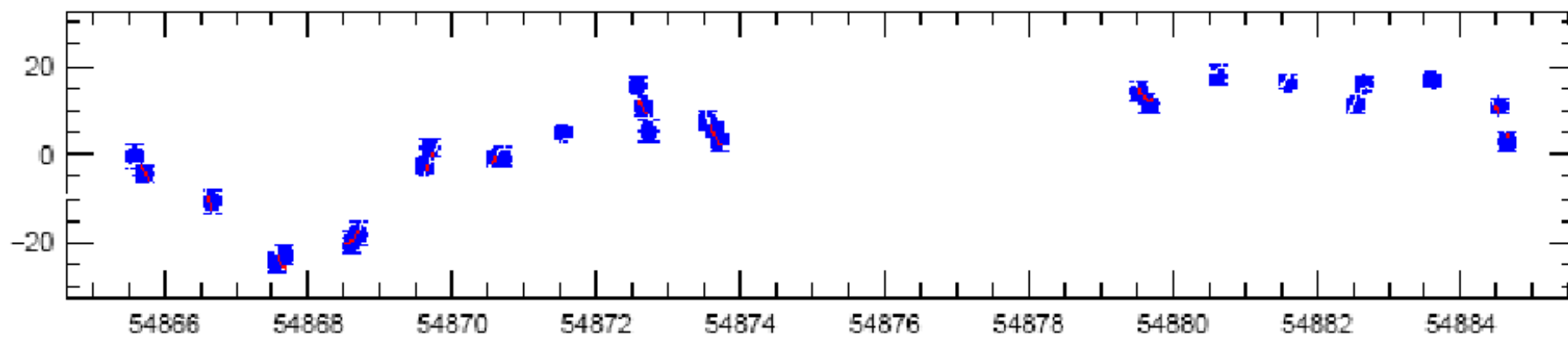
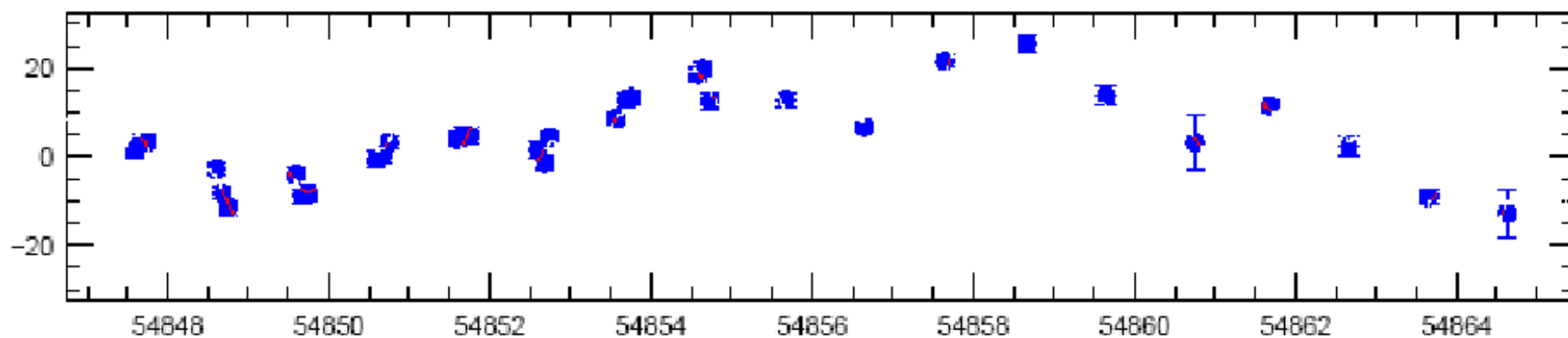
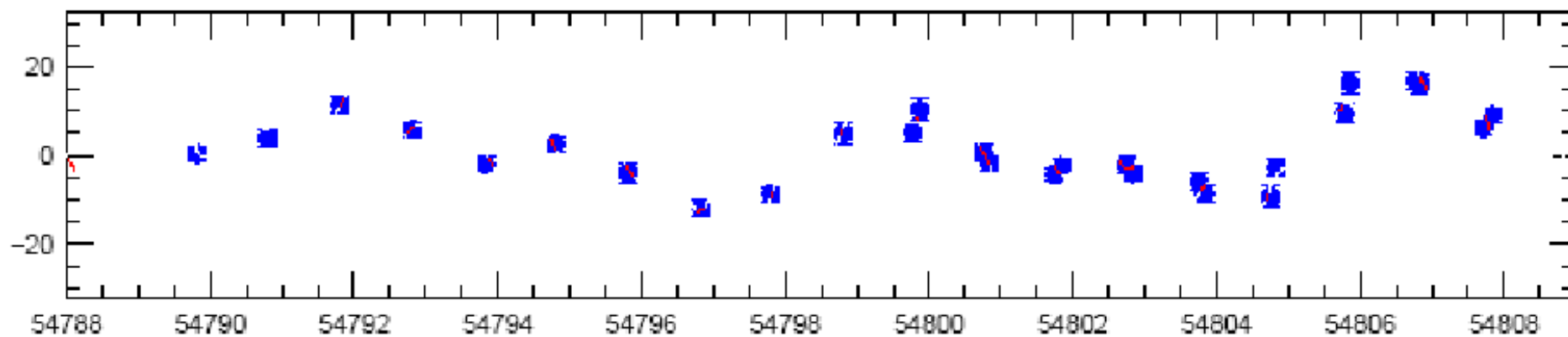


# Possible internal structure (compared to Earth)

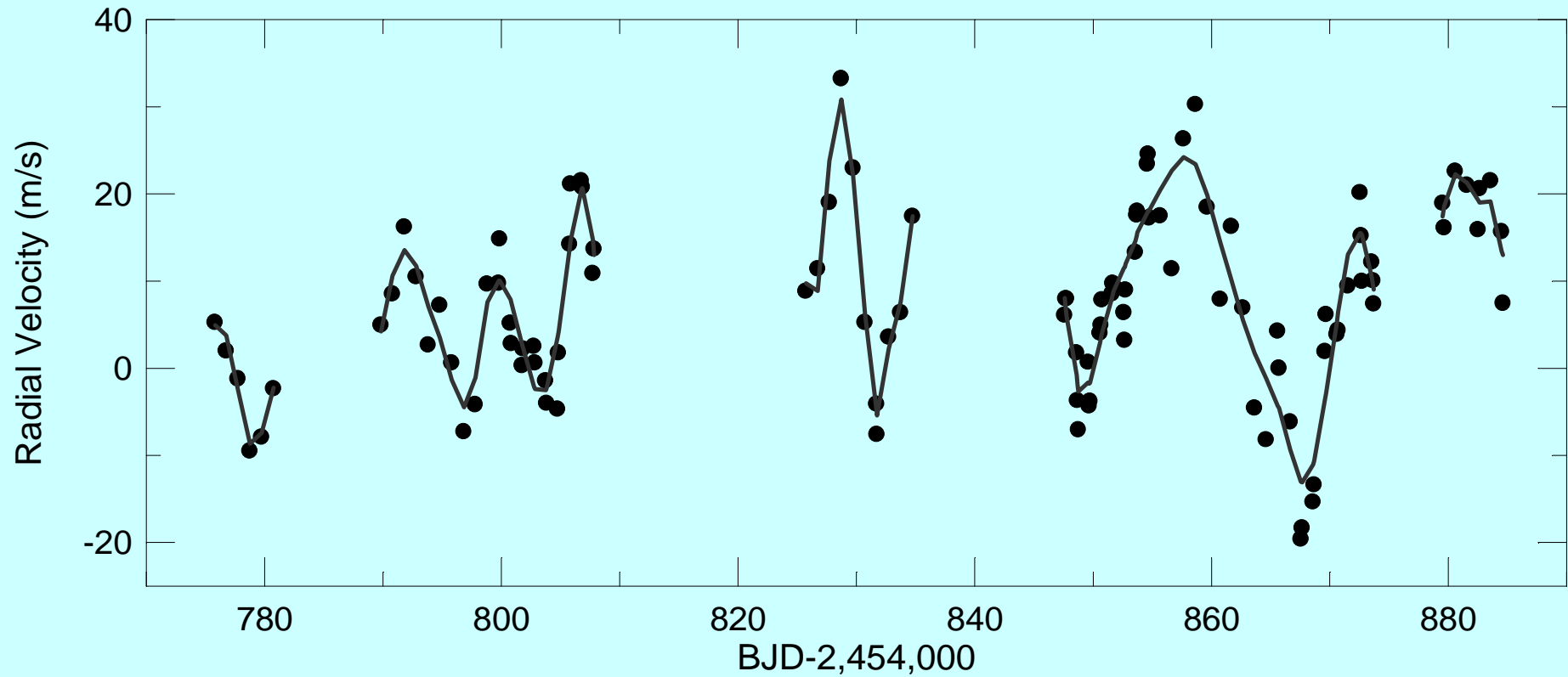




Radial Velocity (m/s)



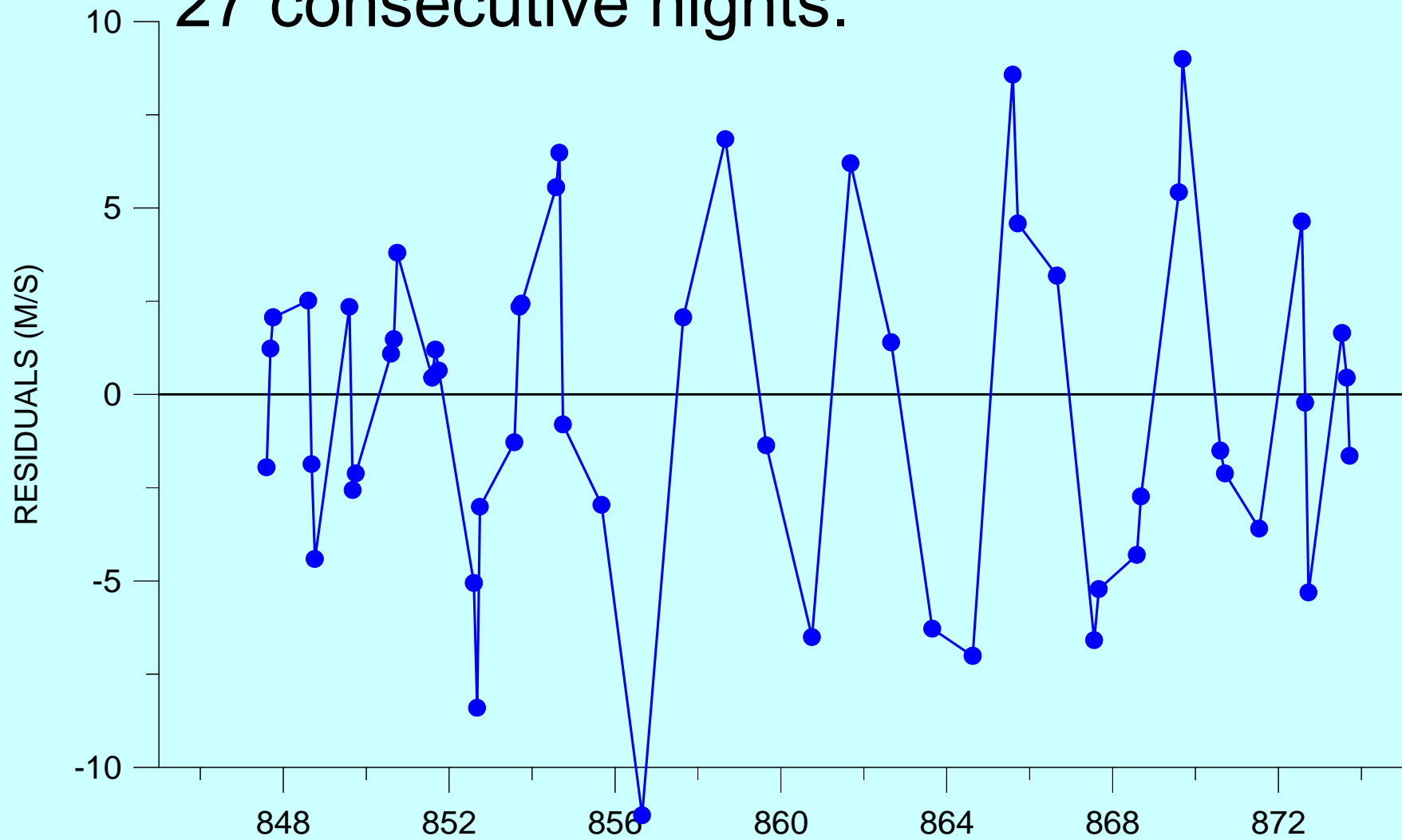
JD - 2400000



Queloz et al. 2009

**Resultados: Massas: 4.8 e 8.4  $M_T$**

Selected sequence:  
52 observations in  
27 consecutive nights.

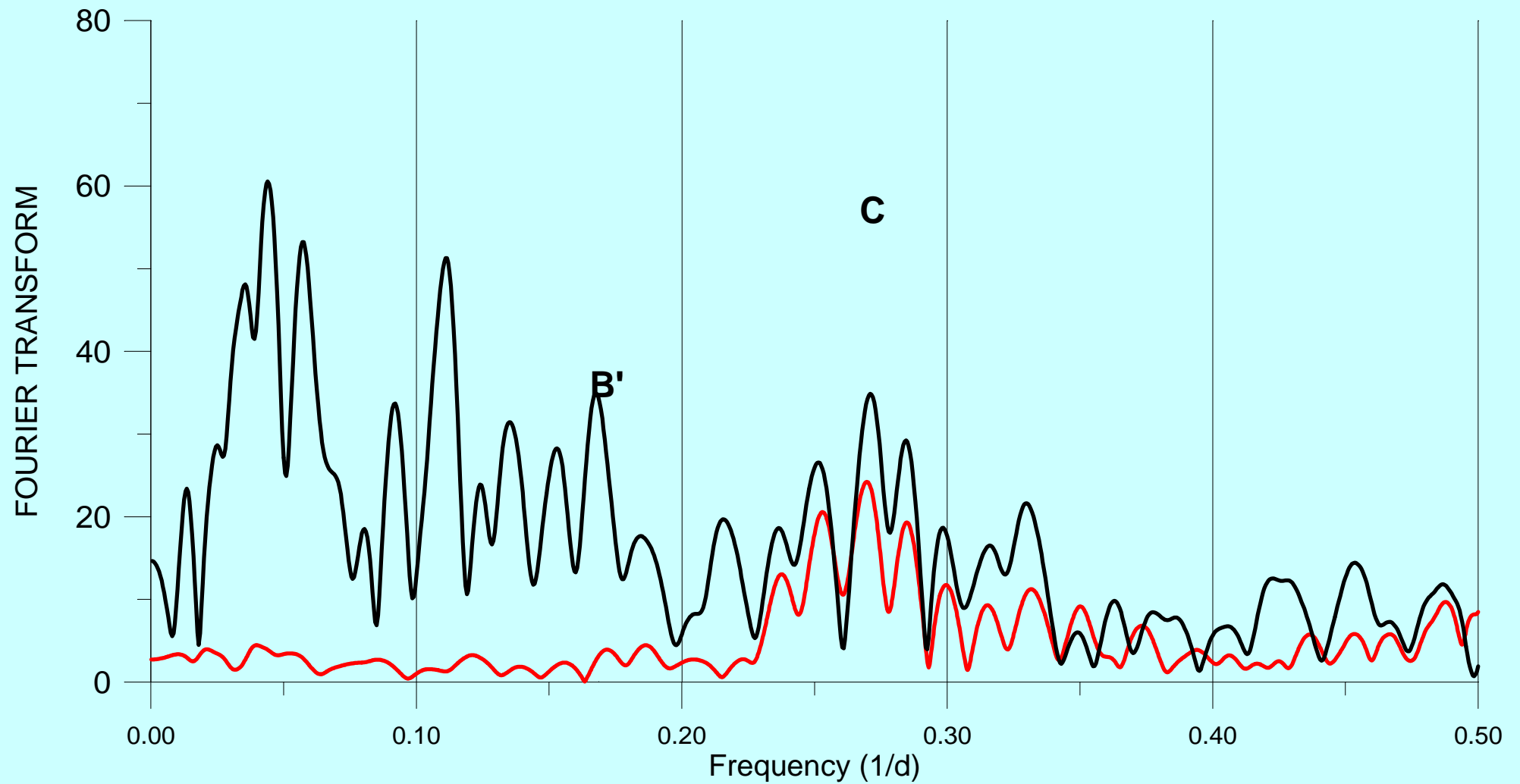


Step 1 – Analysis of the procedures & results of Queloz et al.

Conclusions: The procedure used by Queloz is a **high-pass filter**, but the results show: (i) Low cut-off: The filter eliminated all frequencies above 0.2 cy/d (periods larger than 5d). (ii) The filter affected terms with frequencies higher than the cut-off frequency.

Black: Fourier Transform of the data

Red: Fourier Transform of the residuals used by Queloz et al.

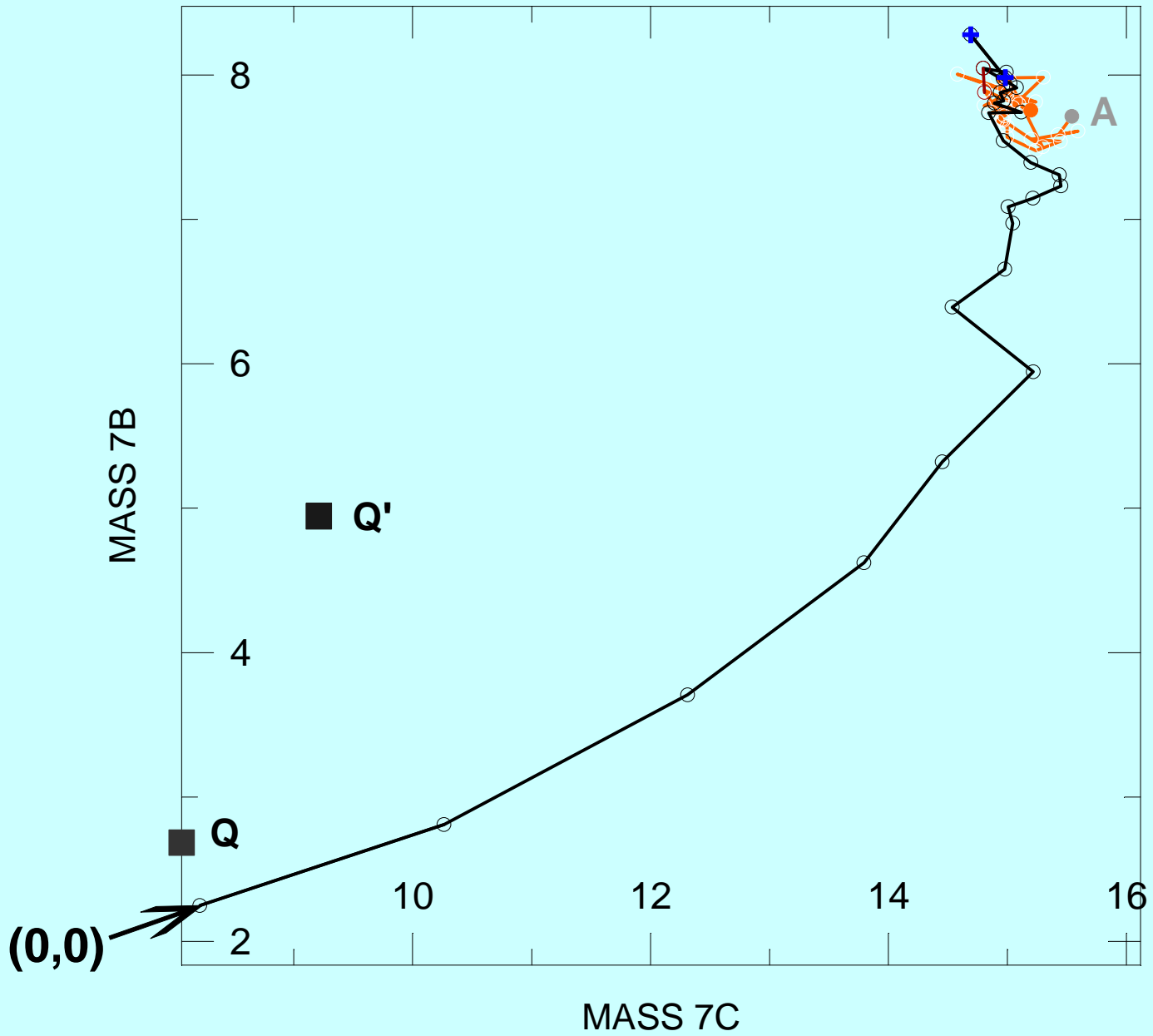


## Step 2 – Improve the high-pass filter

The result of the used filter is biased by the fact that it is being applied to a signal that includes both the RV variations due to the star activity and those due to the planets.

Recipe: Subtract beforehand the (**unknown**) variations due to the planets.  
(Proceed iteratively from an initial solution arbitrarily chosen).





Modelo:  $P, P/2, P/3$  ( $P=23.64$  d)

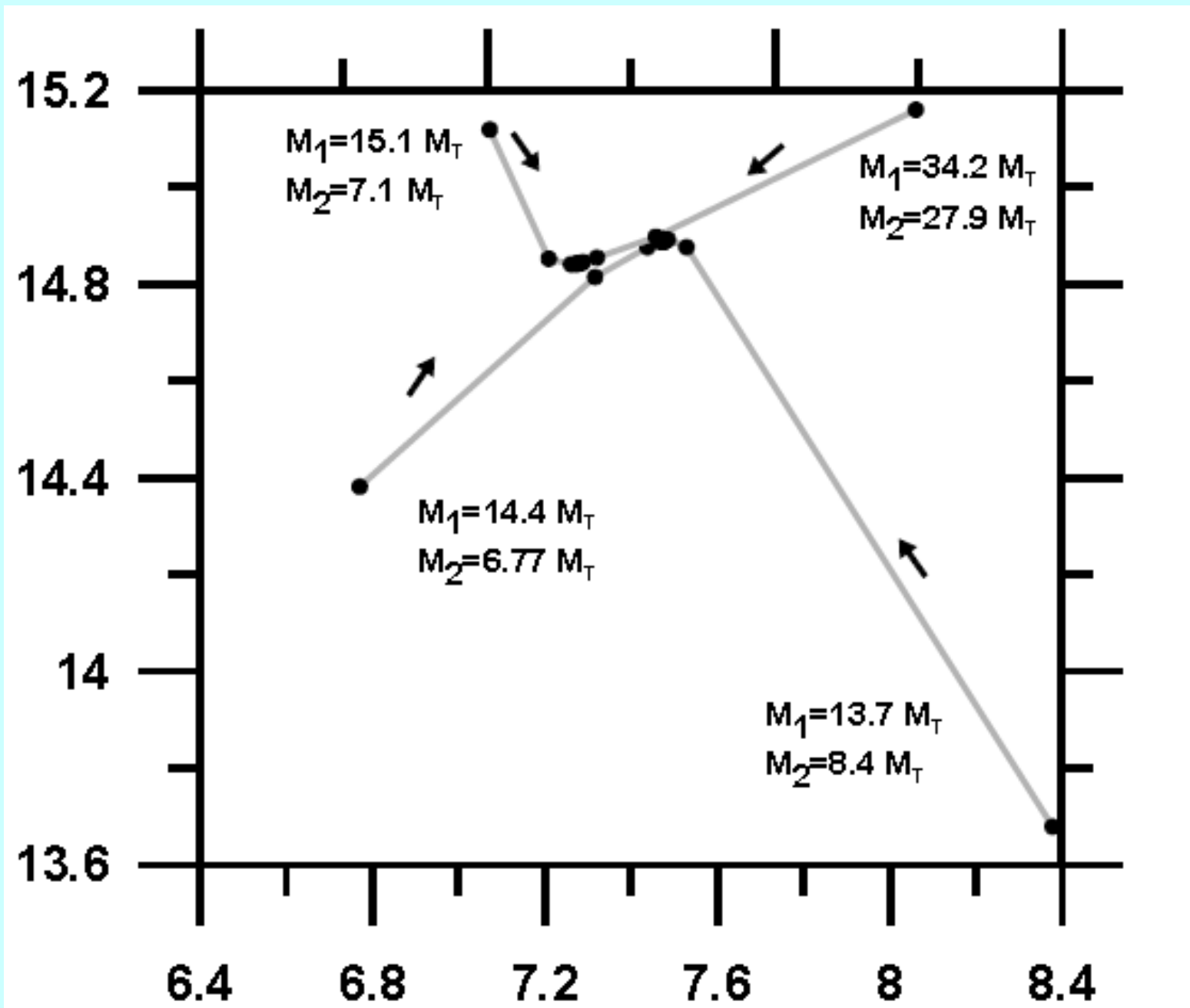
Remaining Problem:

The steepest descent used to compute the solutions is too unstable.

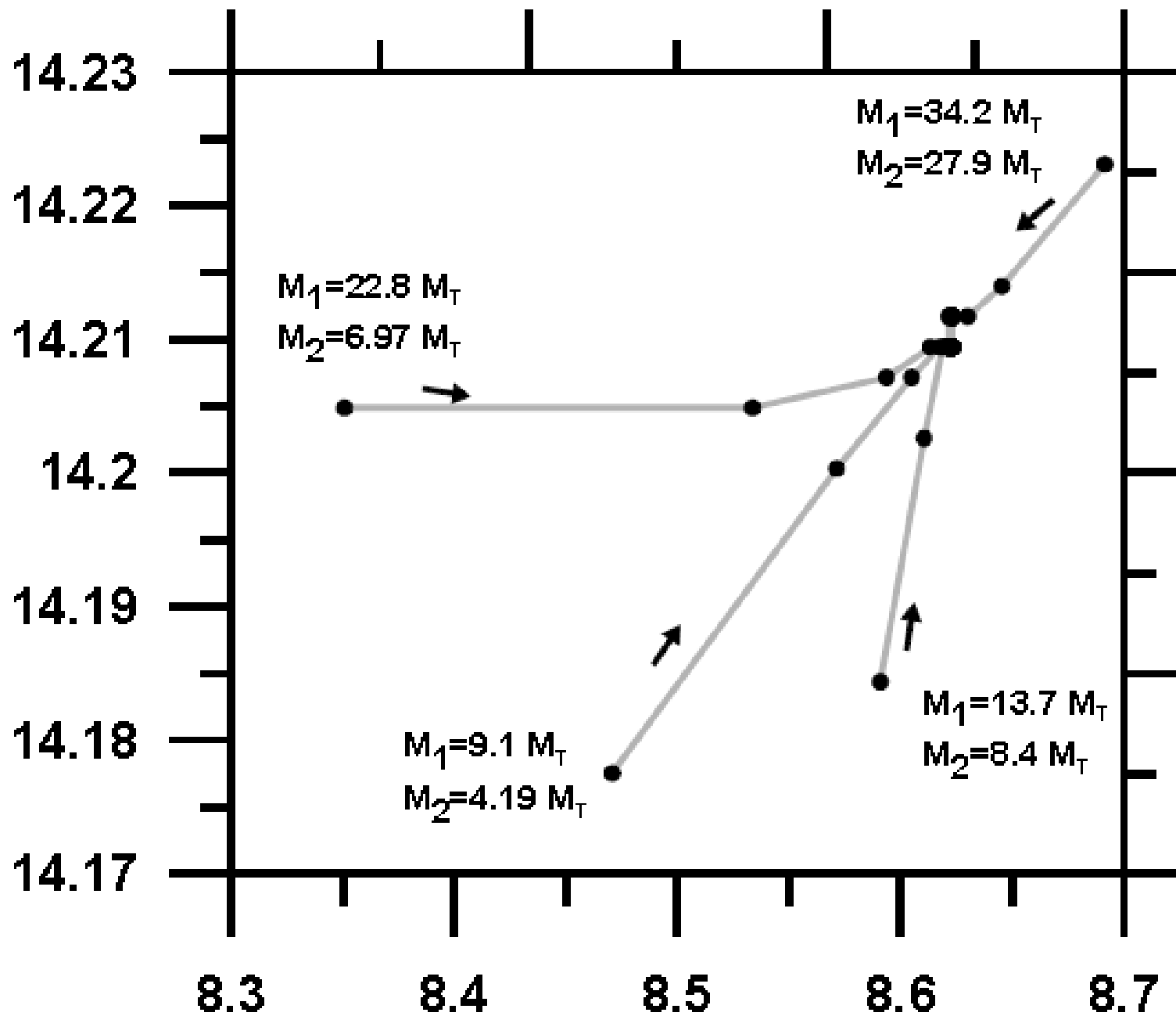
Remedy: Use more stable techniques:

Next results:

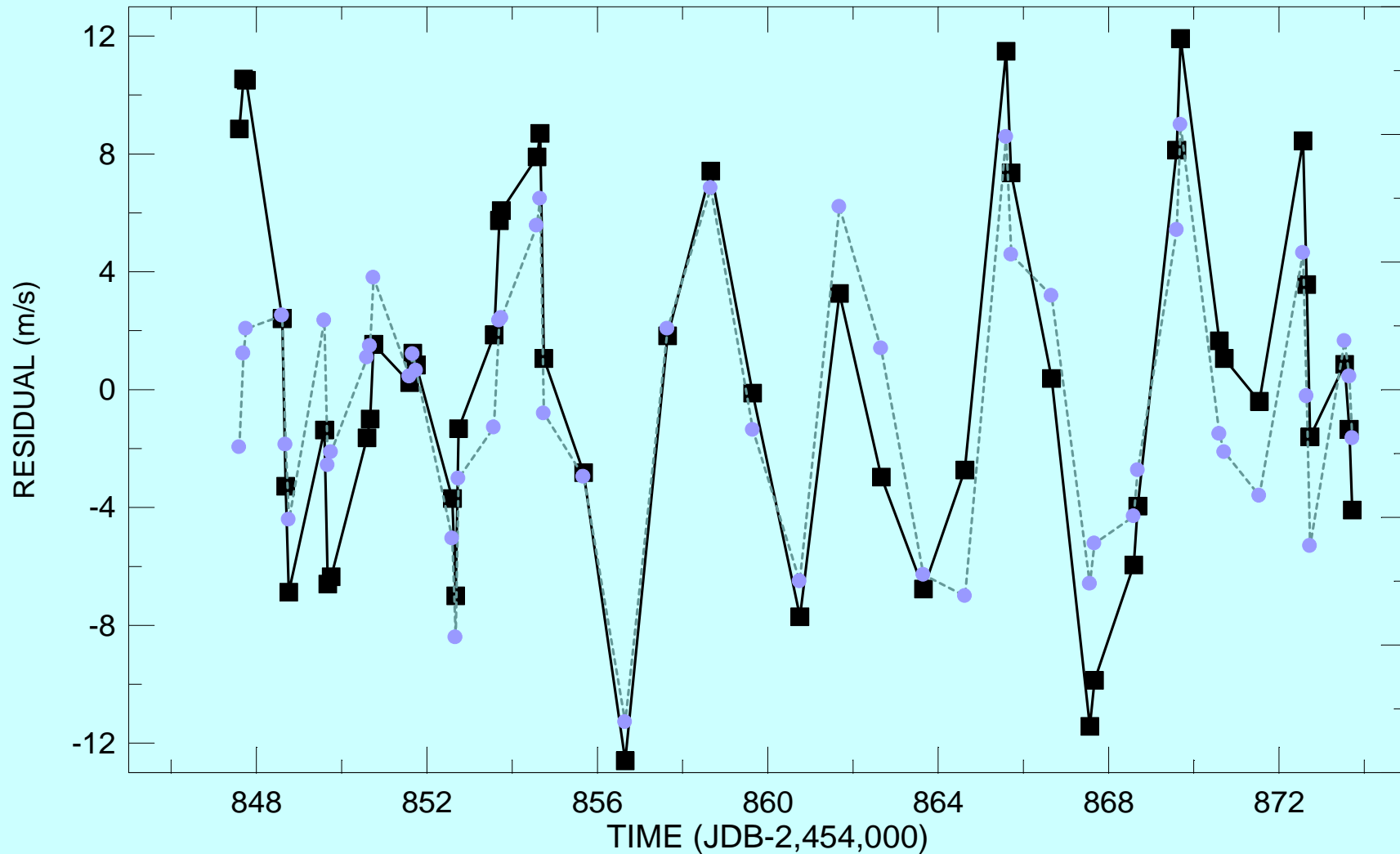
Obtained using genetic algorithms completed with “downhill simplex.”



Modelo P, P/2, P/3 ( $P=21.5d$ )

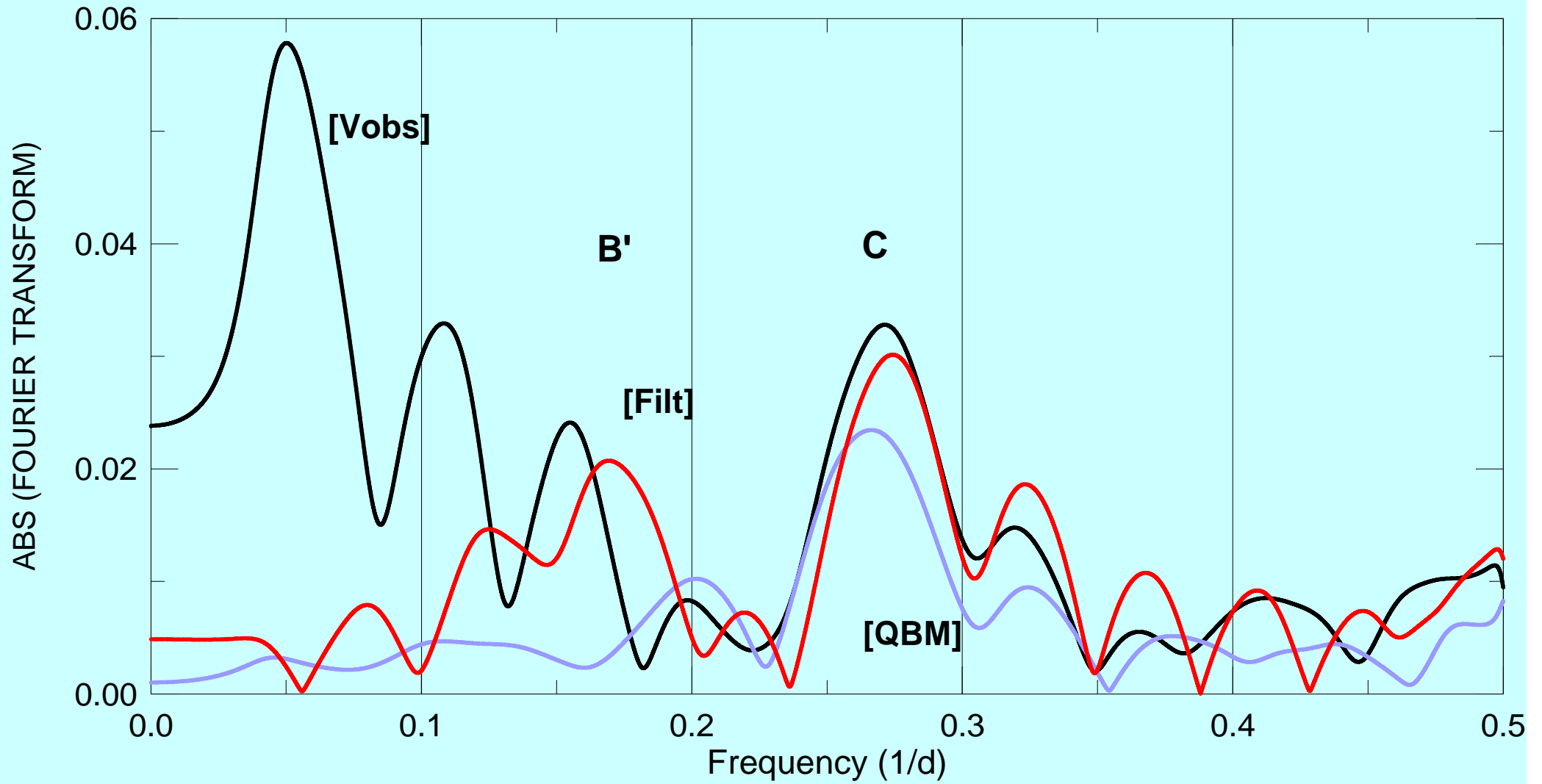


Modelo P,P/2,P/4



Blue: Queloz et al. 2009

Black: SFM, Tadeu dos Santos et al. (yet unpubl.)



SFM, Tadeu dos Santos et al. (yet unpubl.)

**FIM**

