

Garching 11th May 2010

RoPACS

Annual Network Meeting

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Max Planck Institut
für extraterrestrische Physik

Outline

- The project:

Radial velocity curves with high resolution spectra from HRS @ HET

- The data

- Data reduction

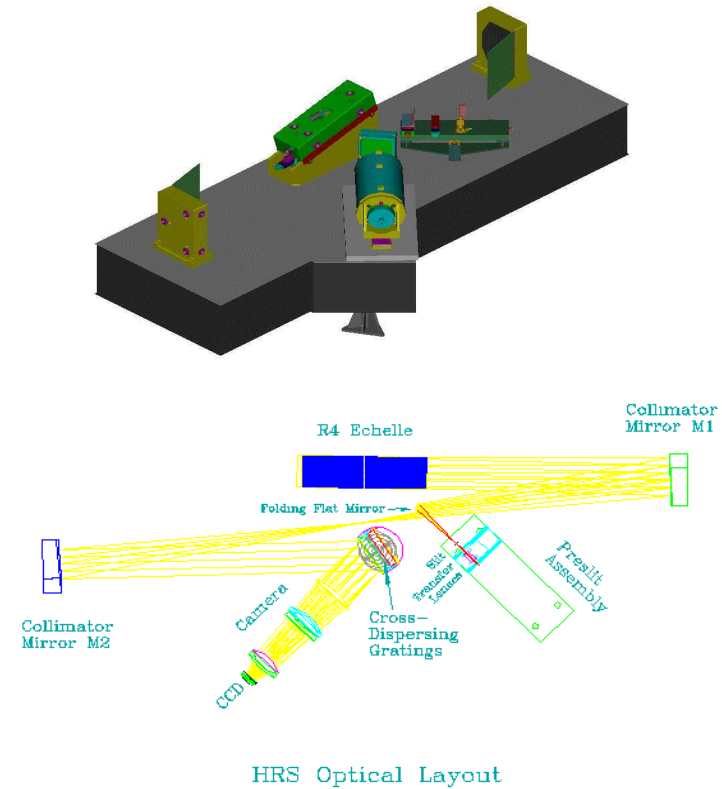
- Data analysis

- First results

- Ongoing work

- GJ1214

PhD PROJECT: Radial velocity curves with high resolution spectra from HRS @ HET



R=60000

Pilot project

HD195019
m = 6.9

Companion:
K=270 m/s

HD352939
m = 9.5

HD 353741
m = 9.6

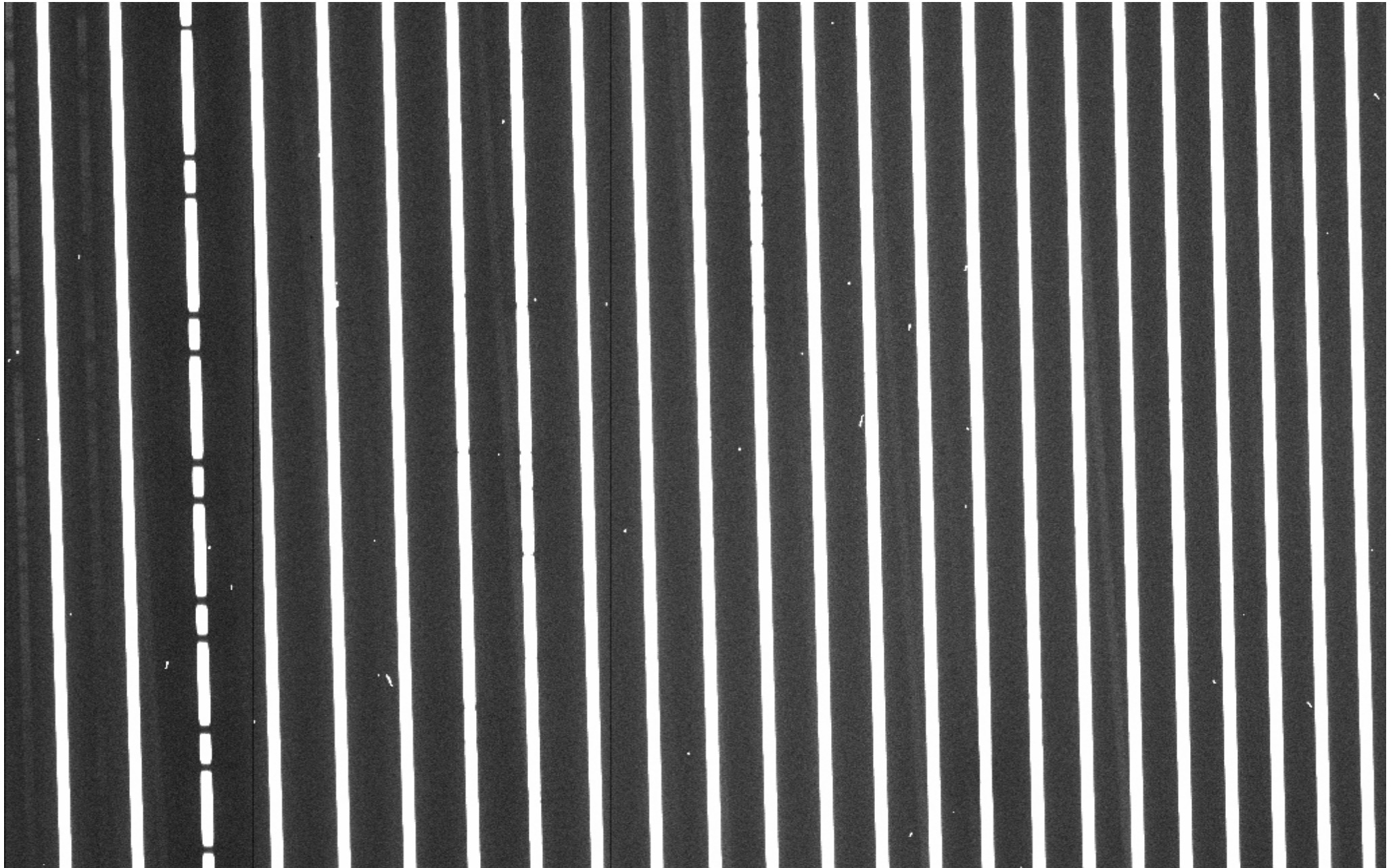
U1050
m = 14.5

	HD195019	HD352939	HD353741	U1050
2008-08-01	X	X		X
2008-08-04	X			X
2008-08-05				X
2008-08-06			X	
2008-08-19	X	X	X	
2008-08-25	X			X
2008-09-04	X	X		
2008-09-14	X			
2008-09-17		X		
2008-09-20	X	X	X	
2008-09-22				X
2008-09-23		X		
2008-09-25	X			
2008-09-27			X	
2008-09-30	X			
2008-10-03		X		X
2008-10-05	X	X	X	
2008-10-09		X	X	
2008-10-10		X	X	
2008-10-16			X	
2008-10-17		X		X
2008-10-18		X	X	
2008-10-20				X
2008-10-21				X
2008-10-31				X
2008-11-08			X	
2008-11-13			X	
2008-11-16				X

Data reduction

- Master-bias and Master-flatfield
- Aperture position
- Order trace
- Order profile fitting
- ThAr wavelength calibration
- Science frame calibration

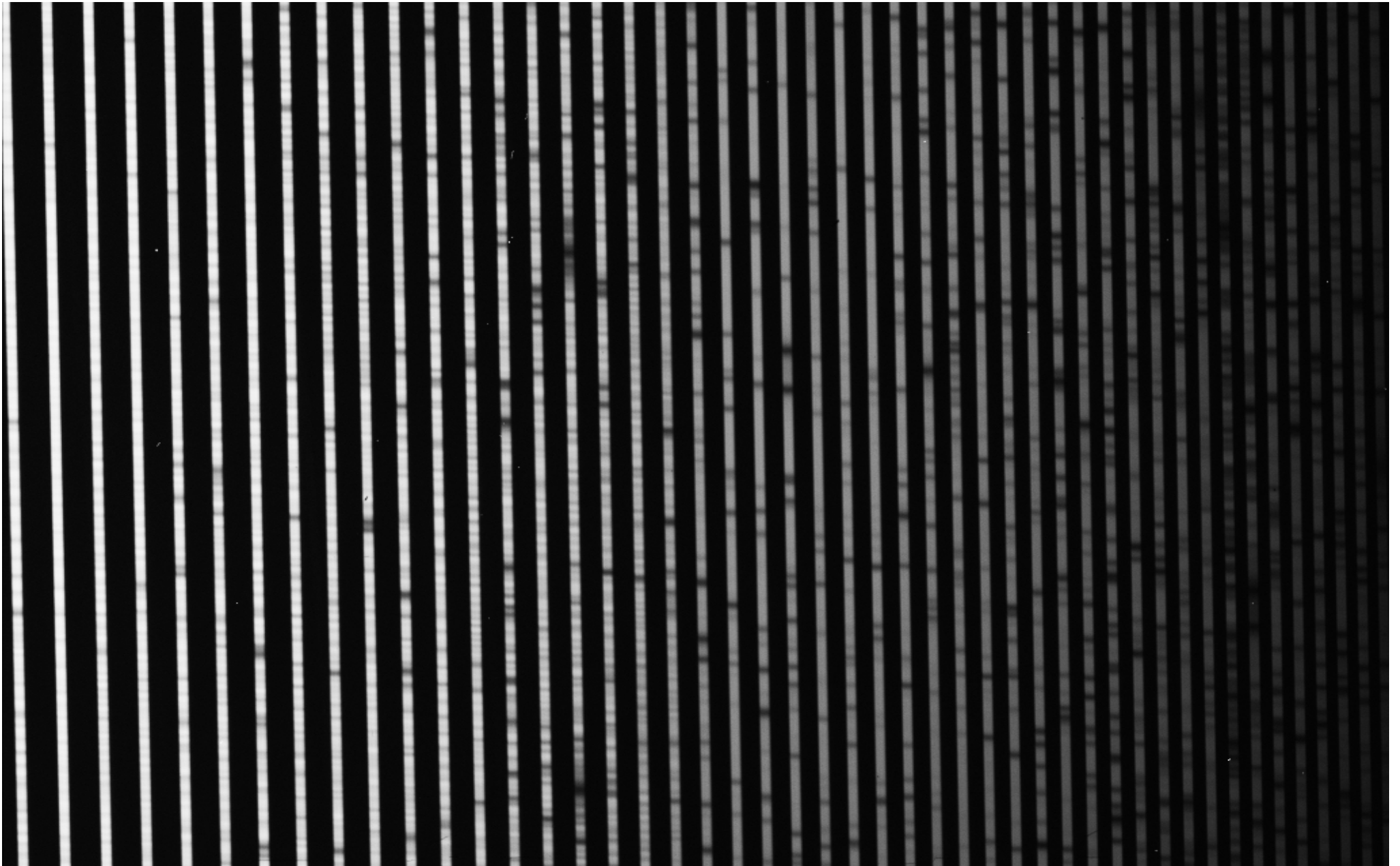
Data reduction



Data reduction



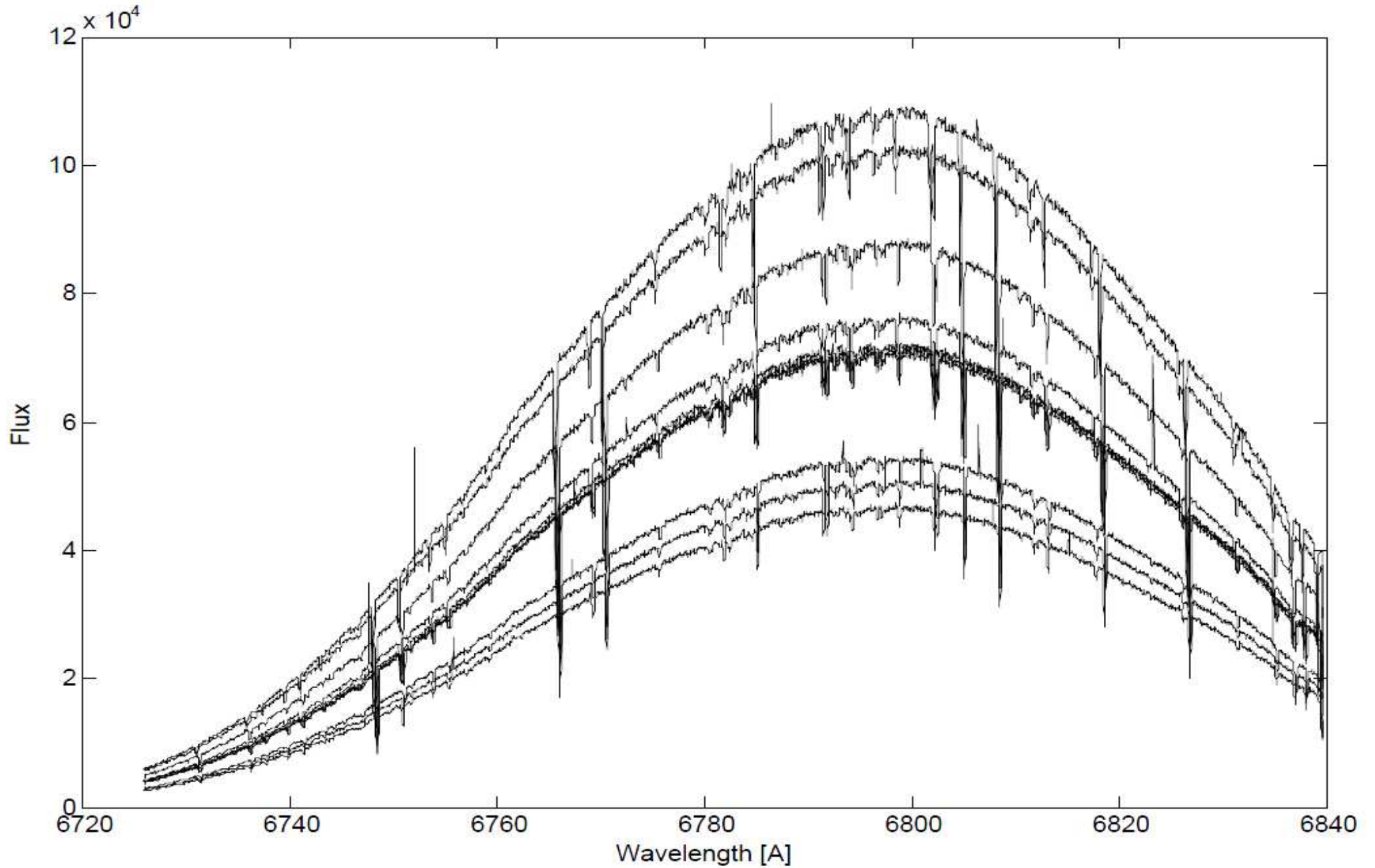
Data reduction



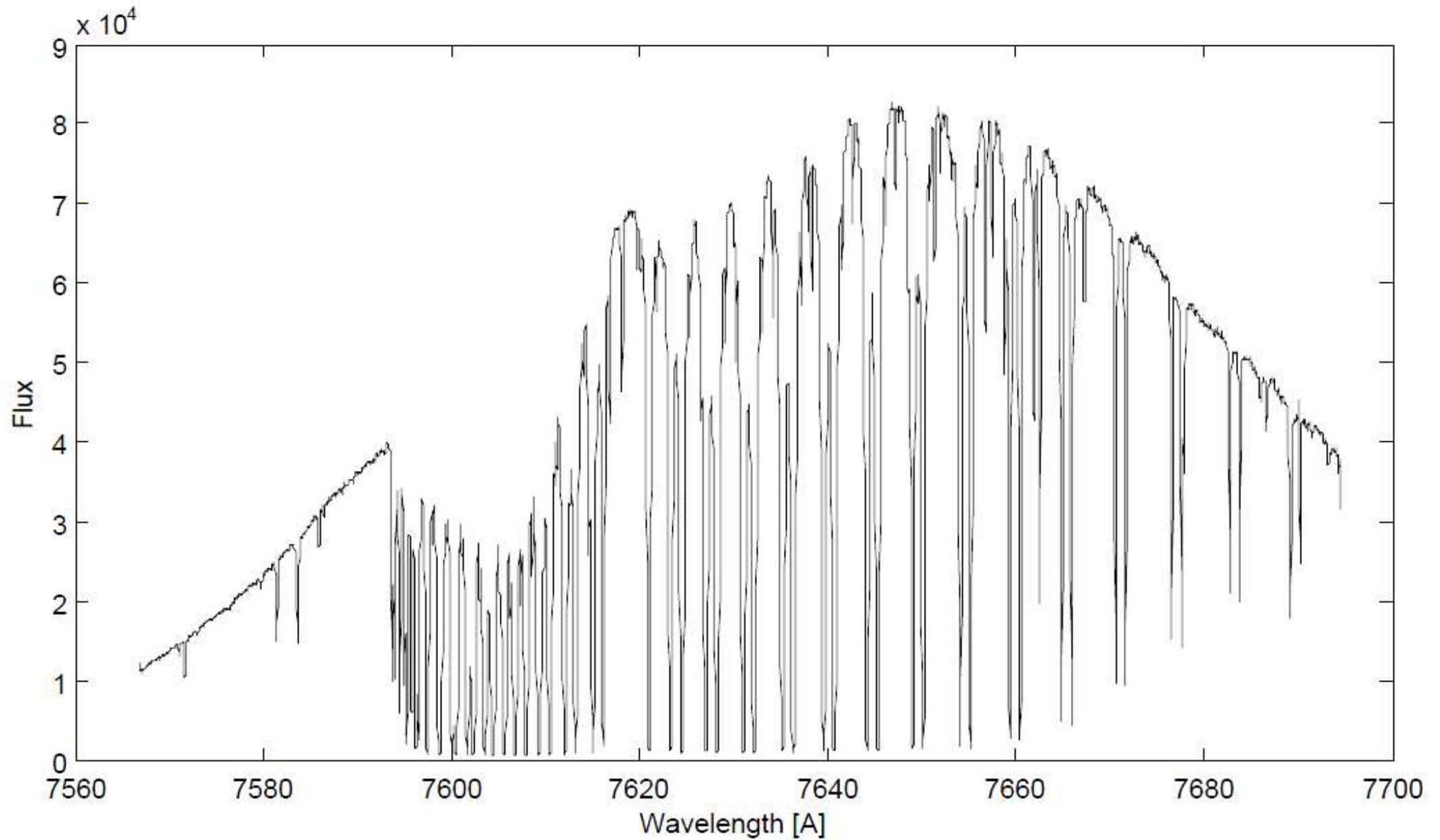
Data reduction

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- Science spectra extraction

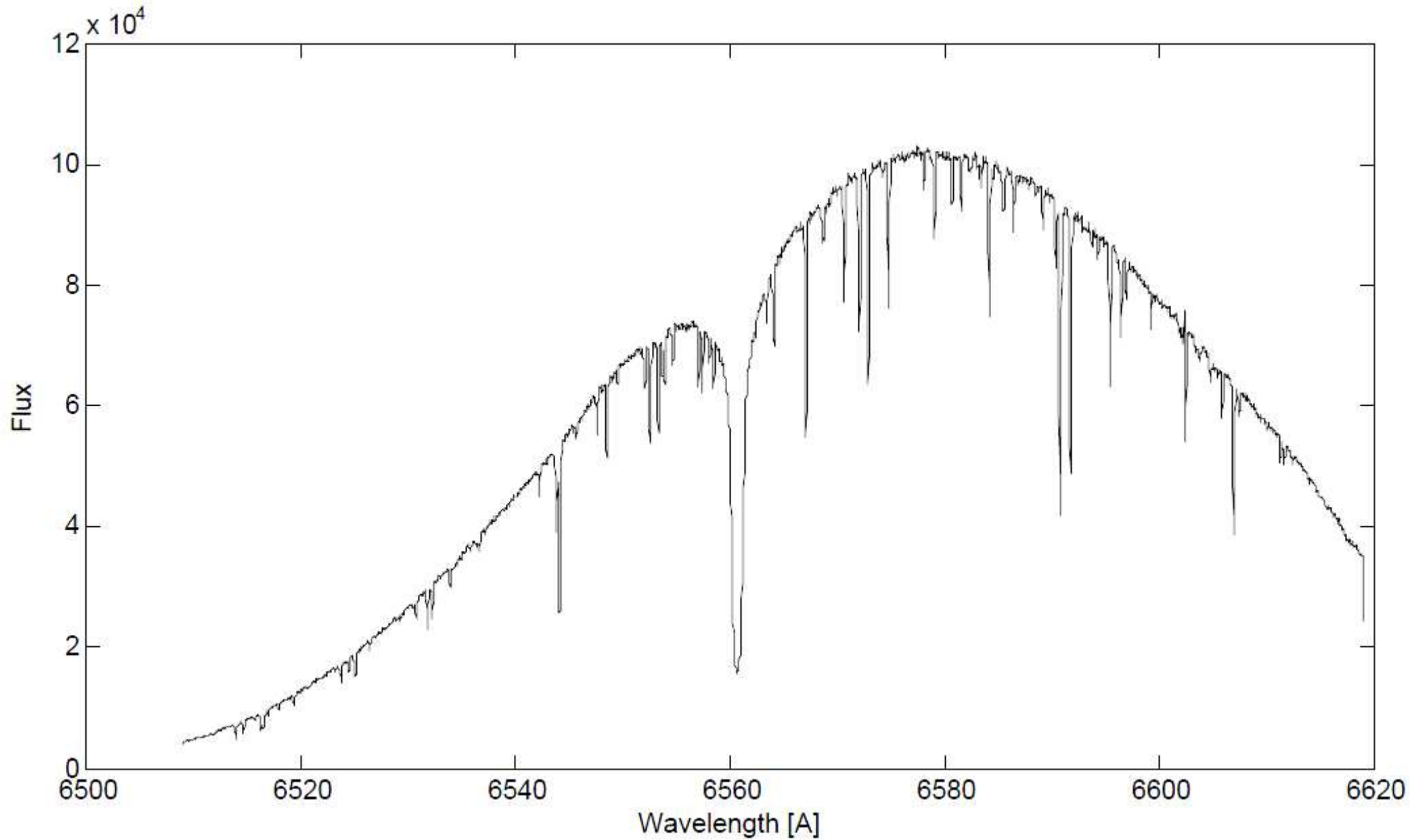
Data reduction



Data reduction

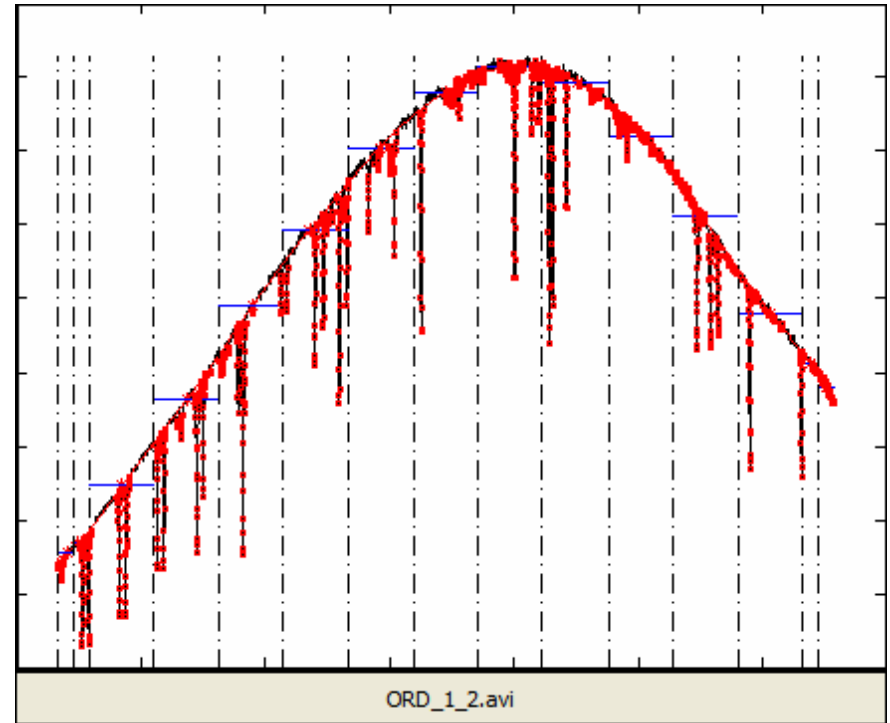


Data reduction



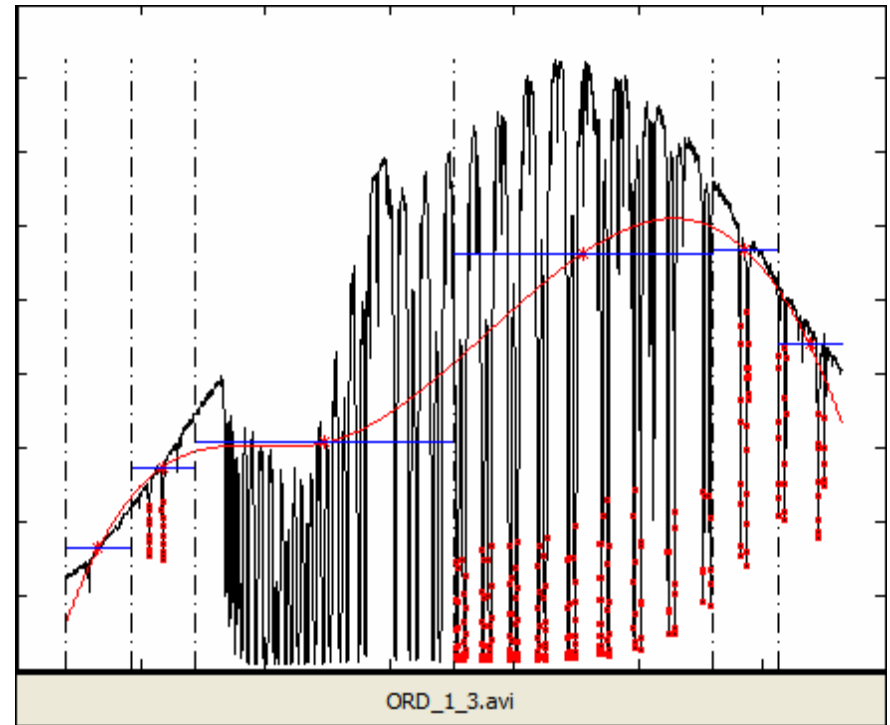
Data reduction

- Master-bias and Master-flatfield
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- Order trace
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- ThAr wavelength calibration
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- Science spectra extraction
- Science spectra normalization



Data reduction

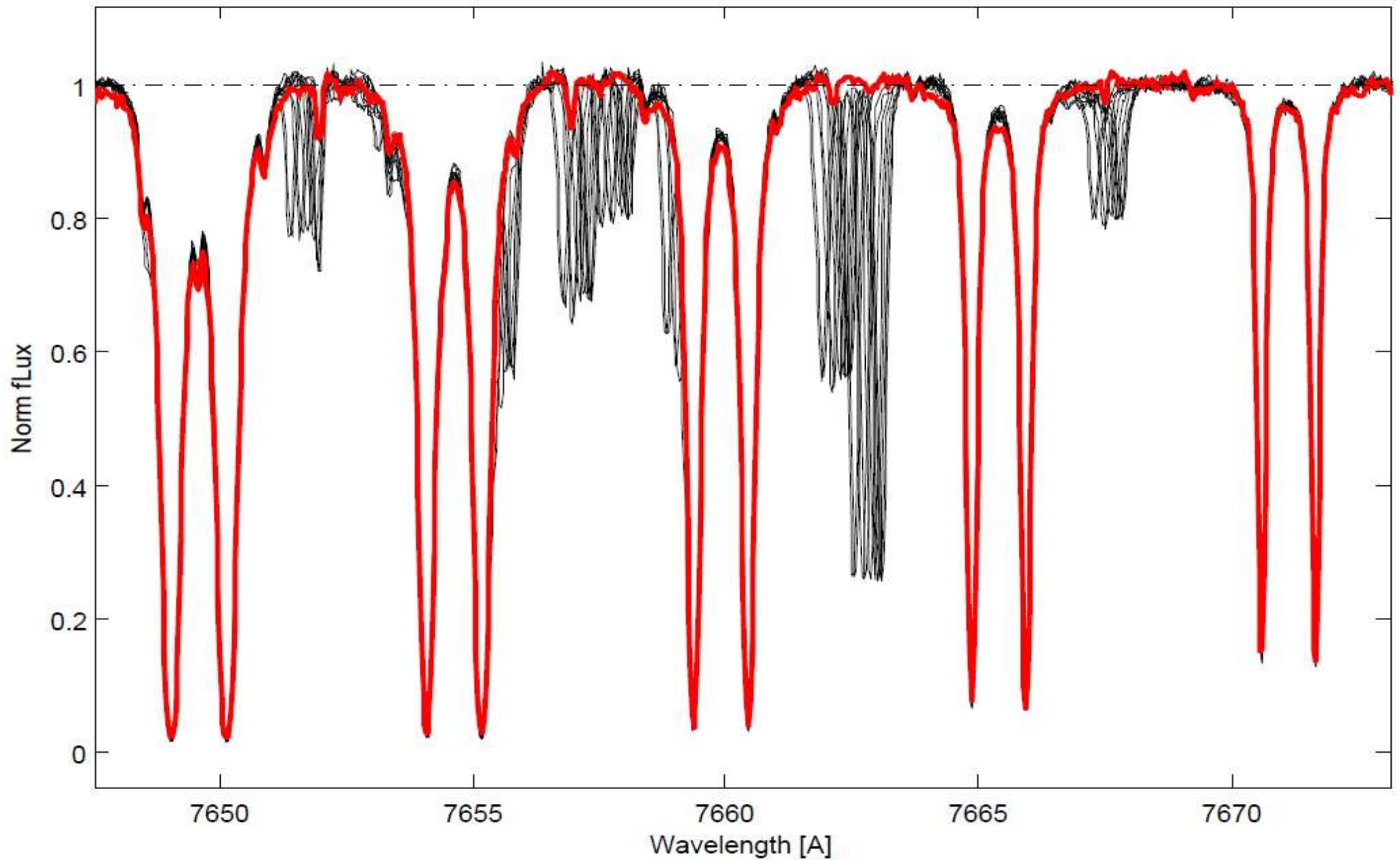
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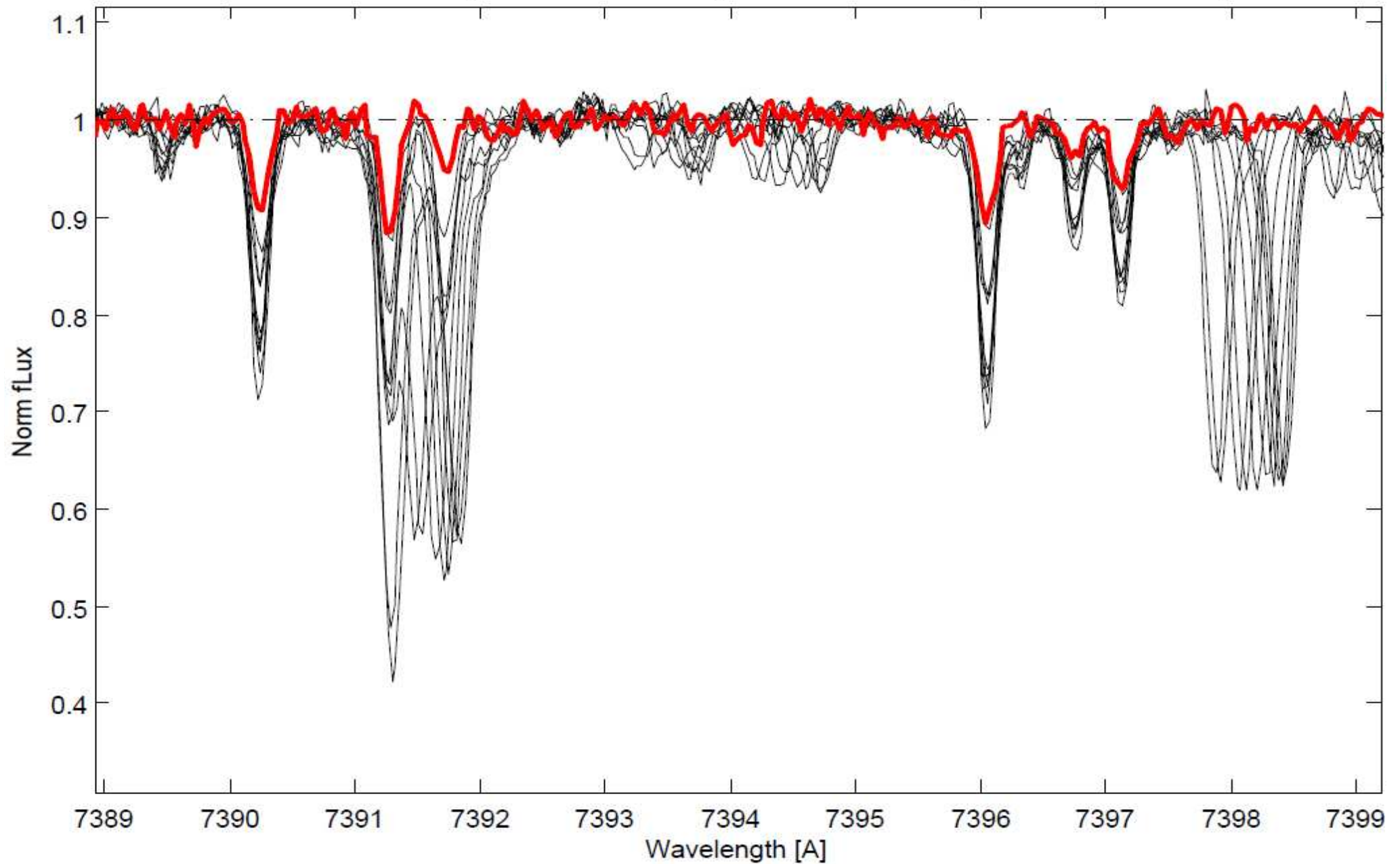
Data analysis

- Cosmic rays filtering
- Mask of the telluric lines

Data analysis



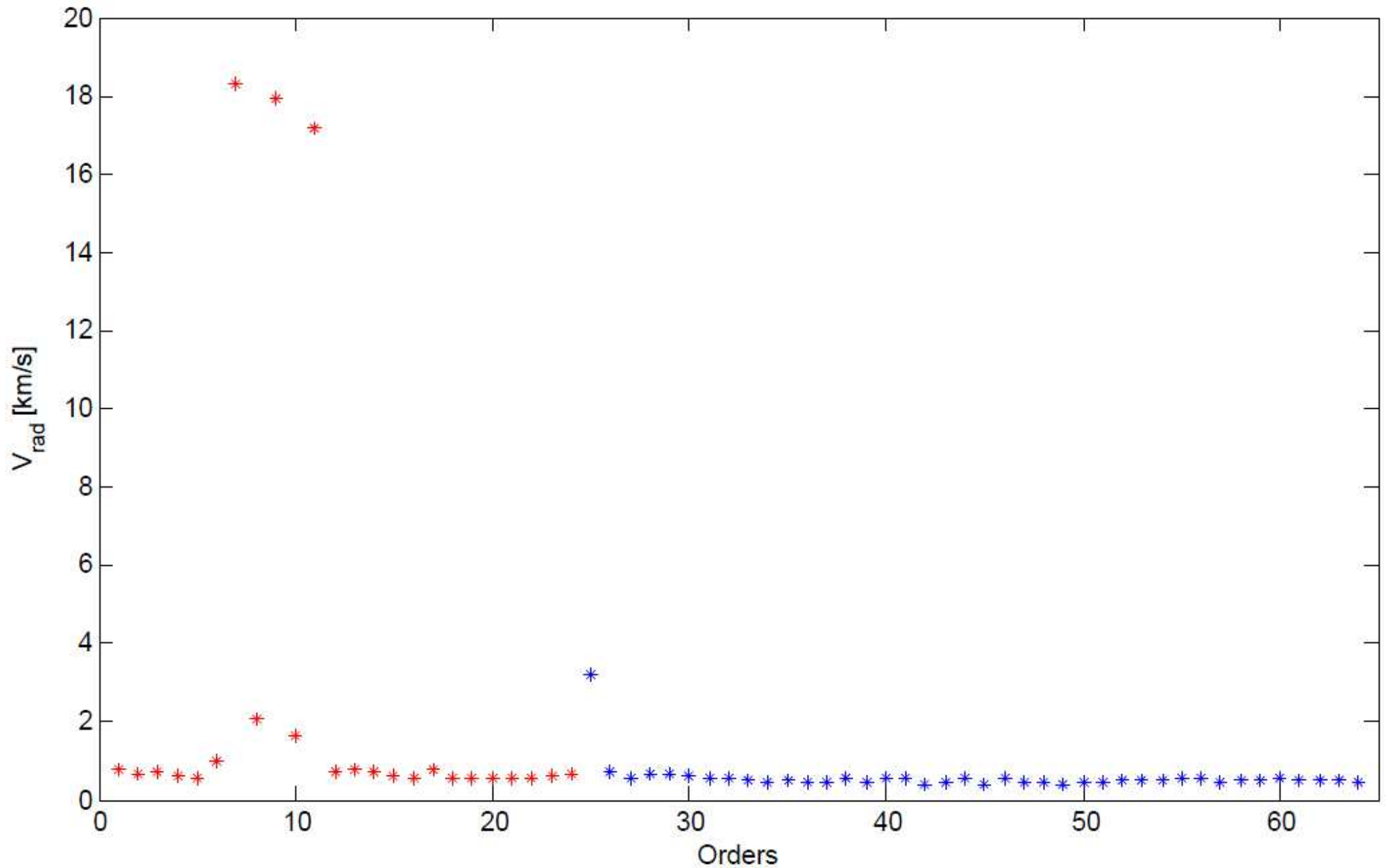
Data analysis



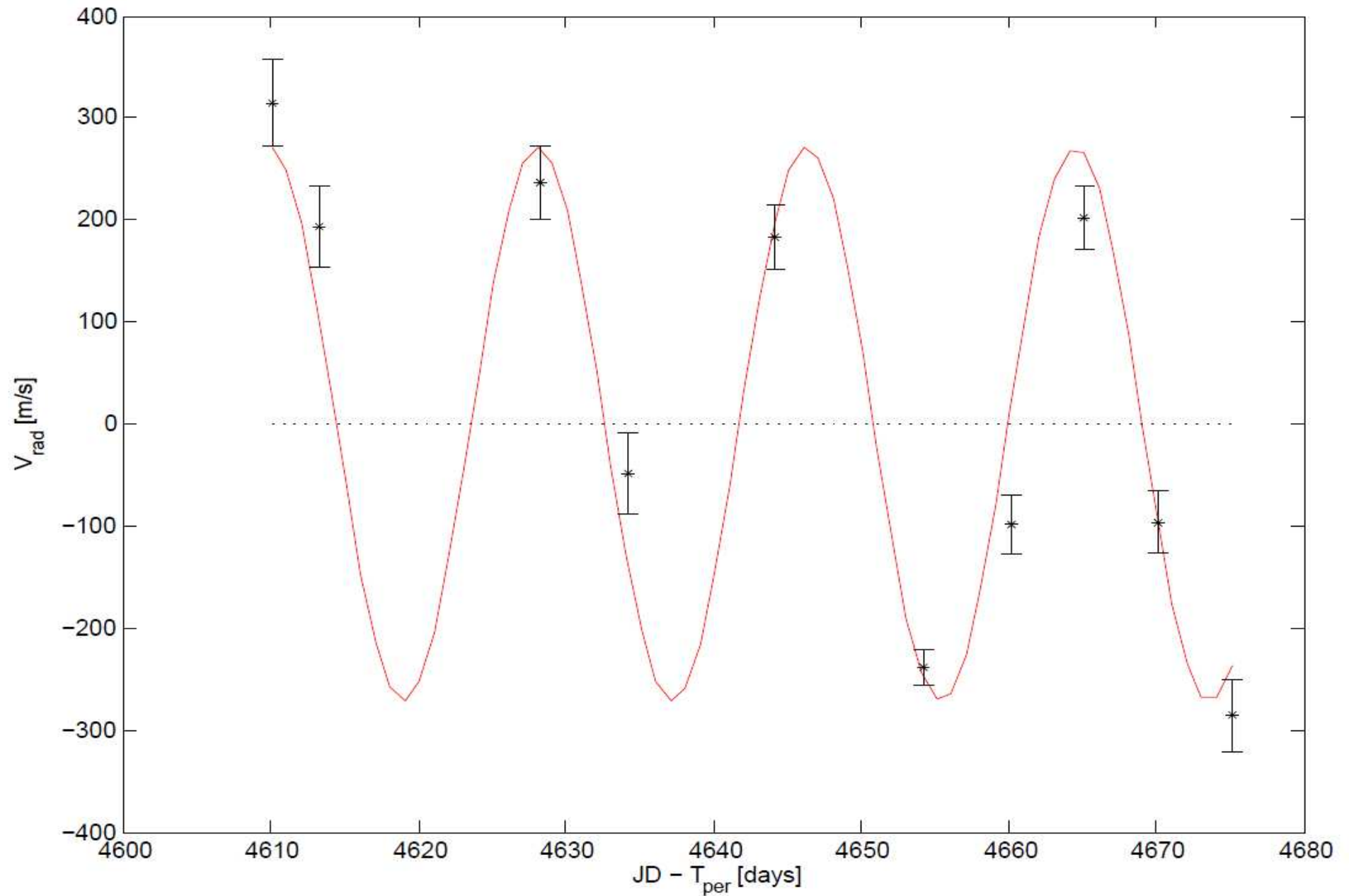
Data analysis

- Cosmic rays filtering
- Mask of the telluric lines
- Heliocentric wavelength correction
- Cross correlation

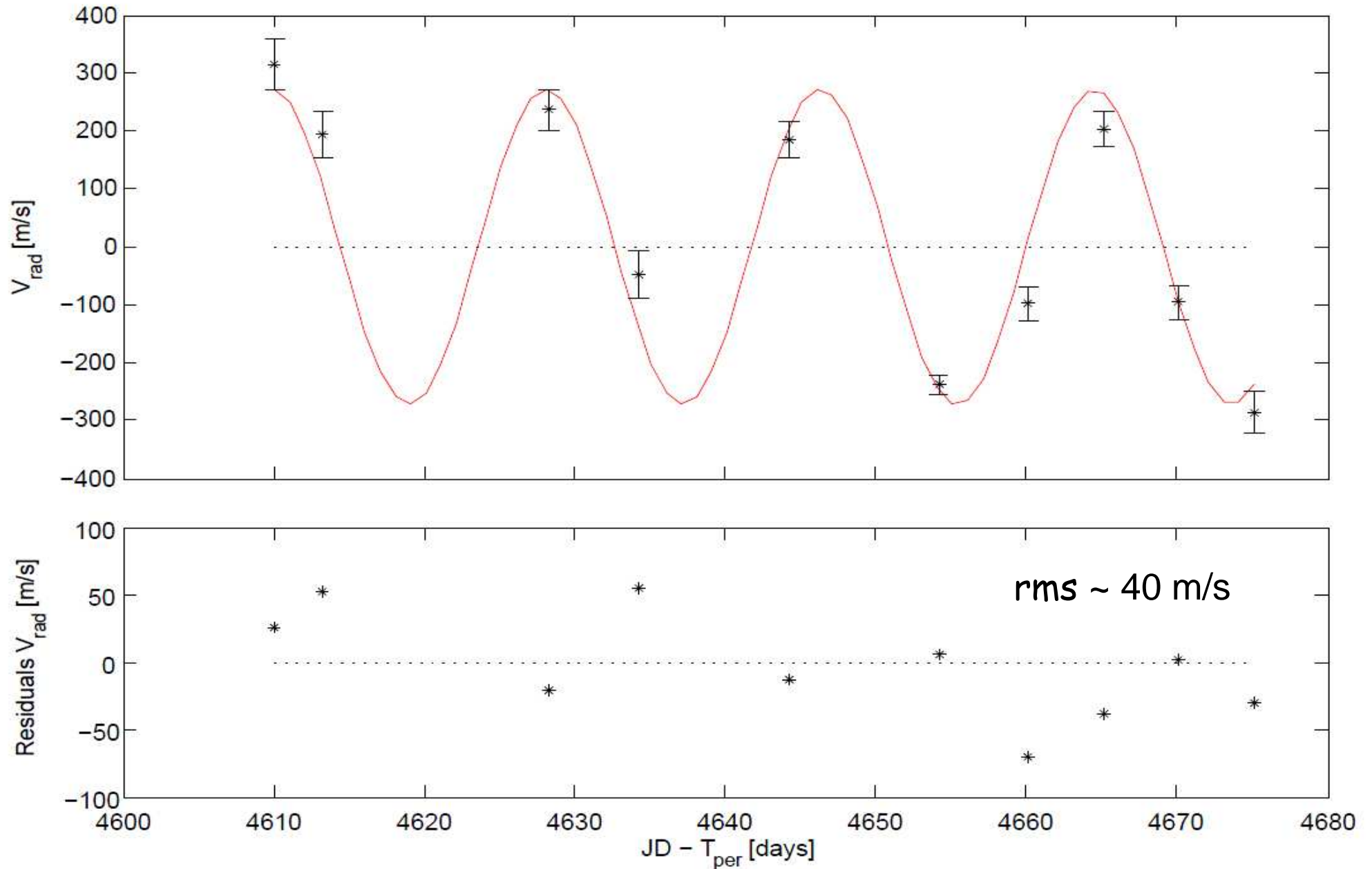
Data analysis



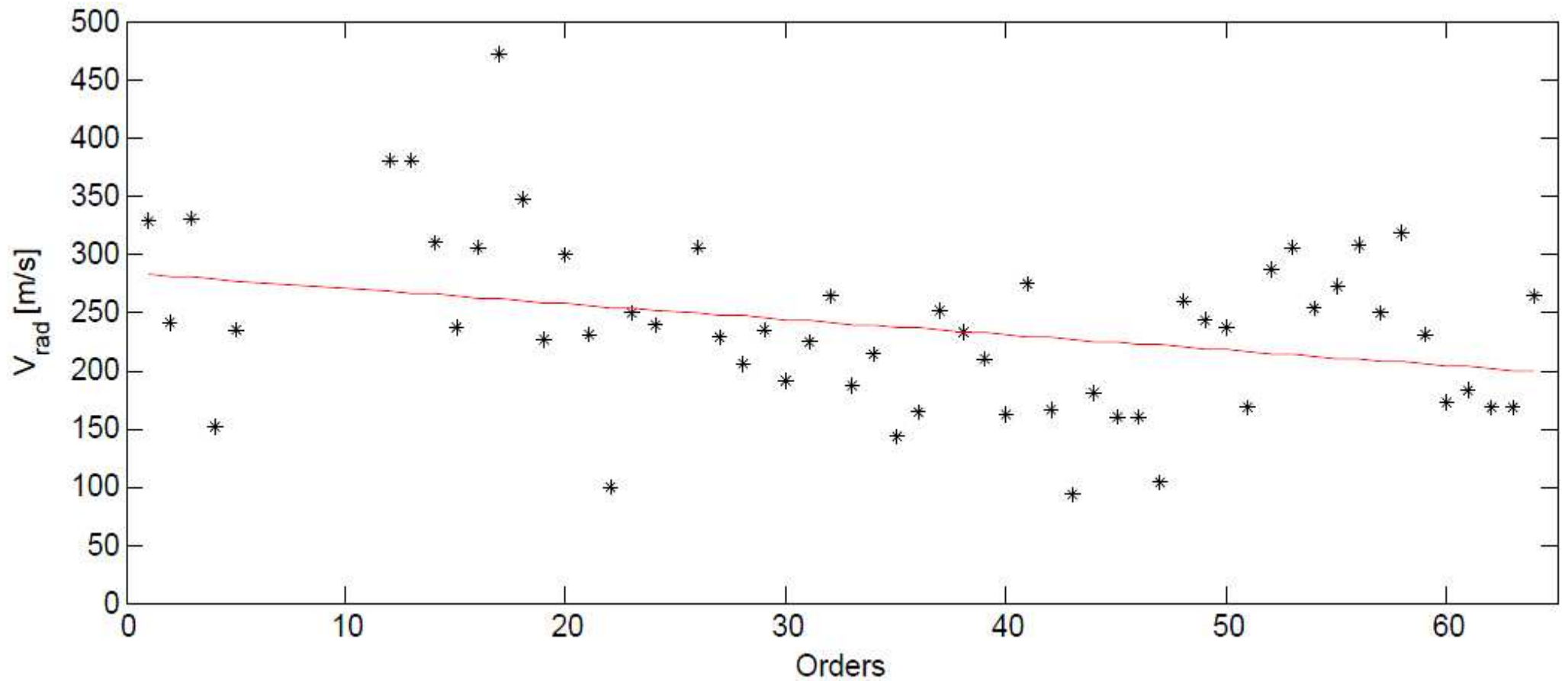
First result



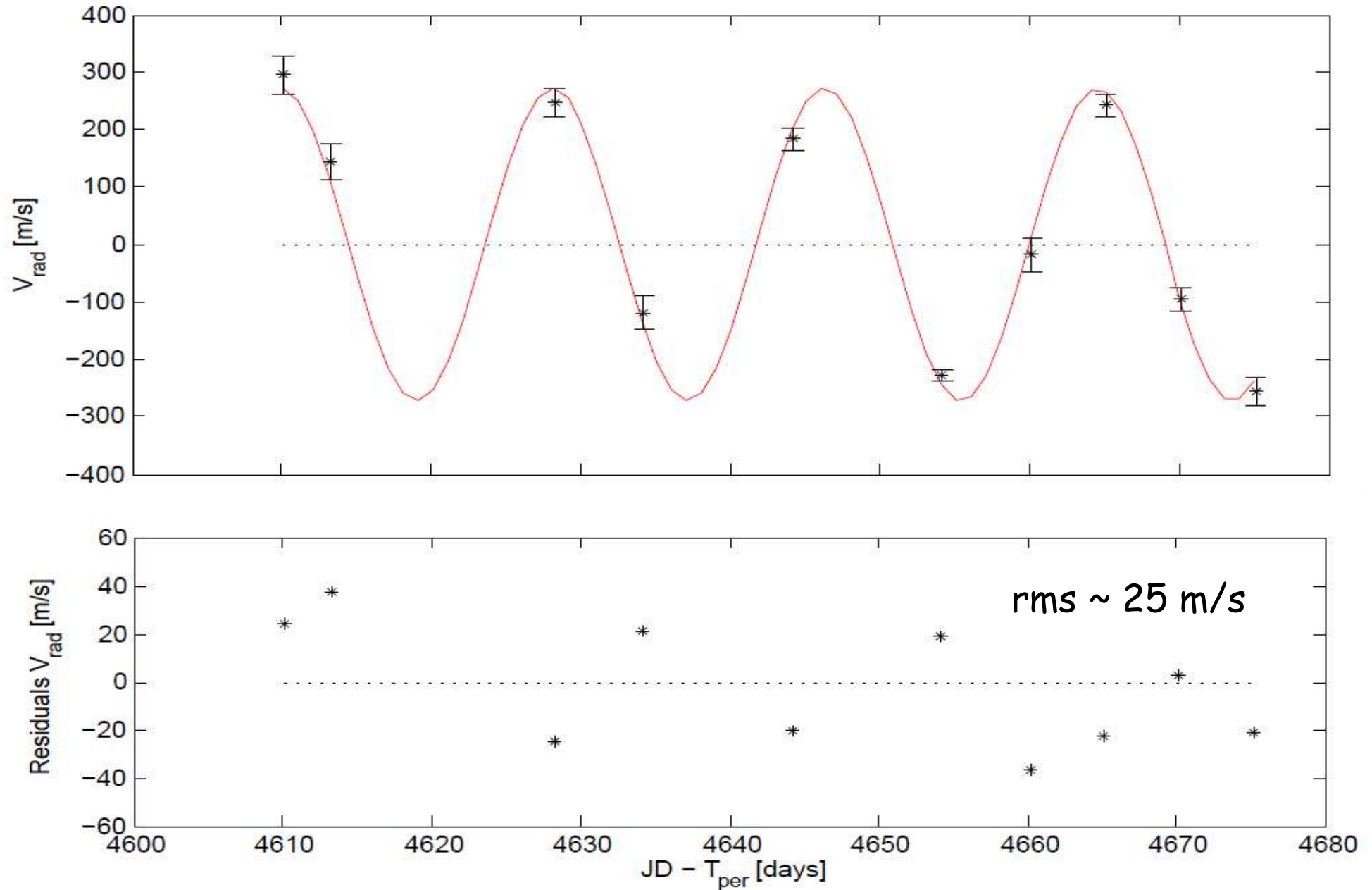
First result



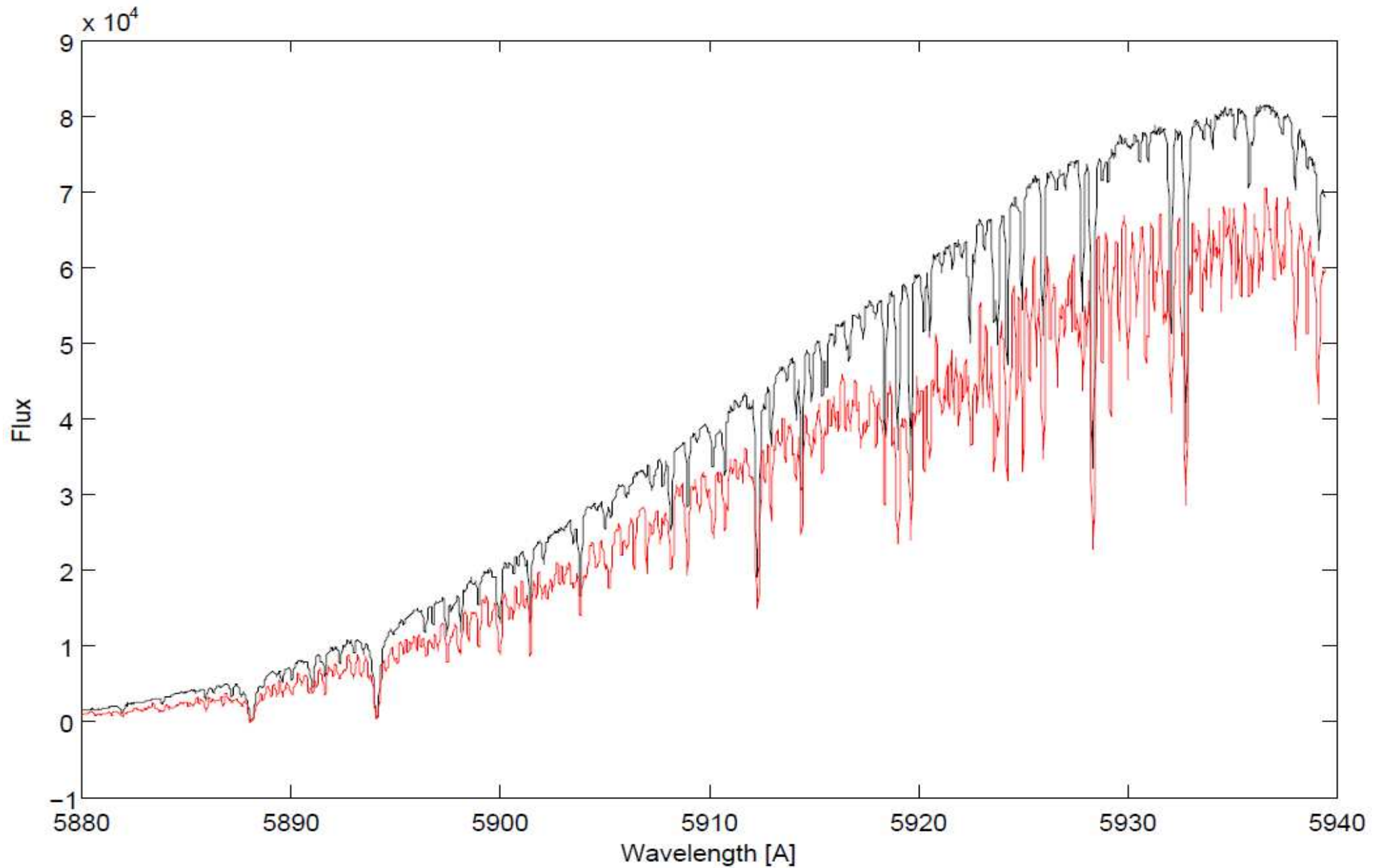
First result



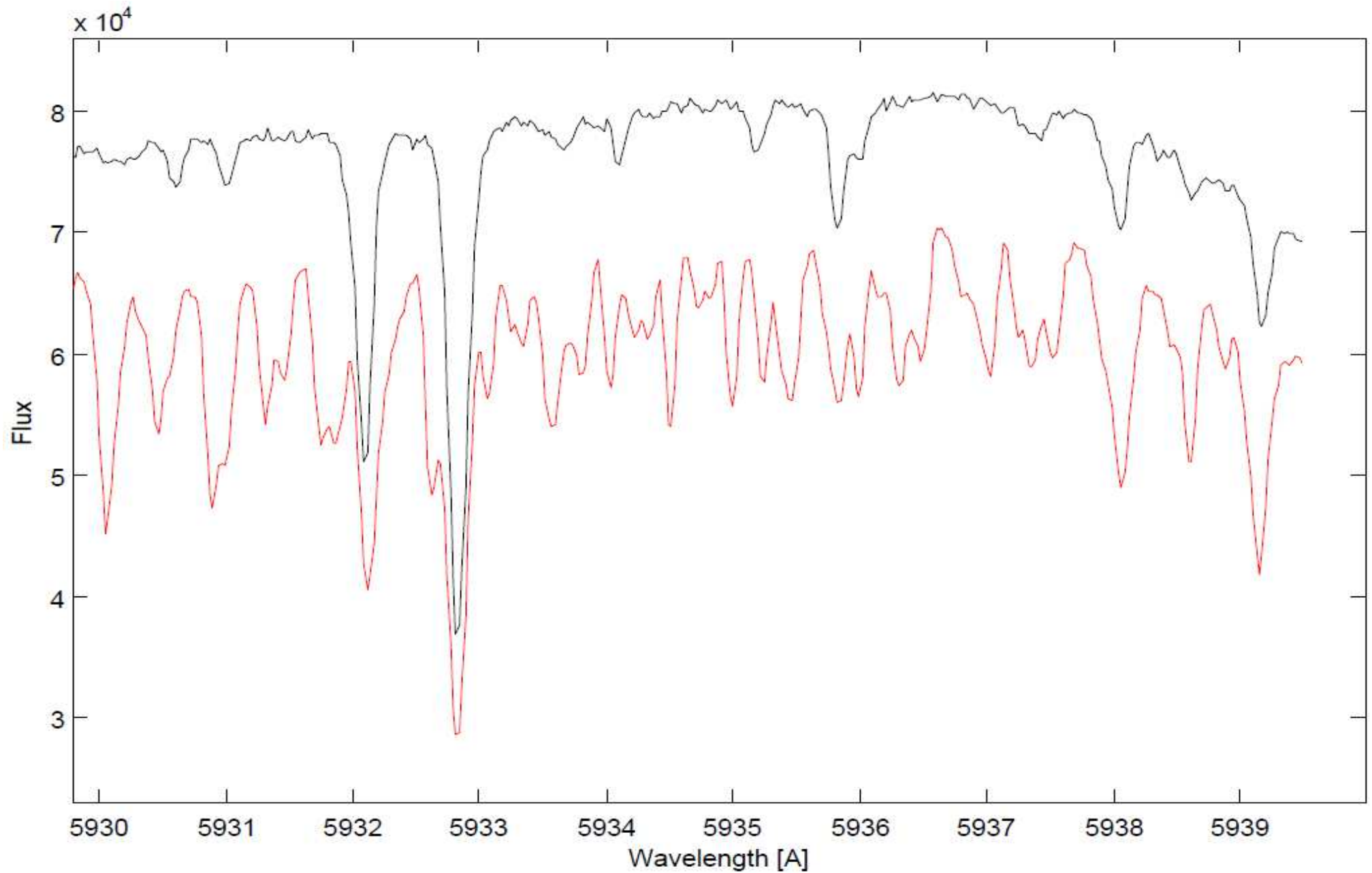
First result



Ongoing work

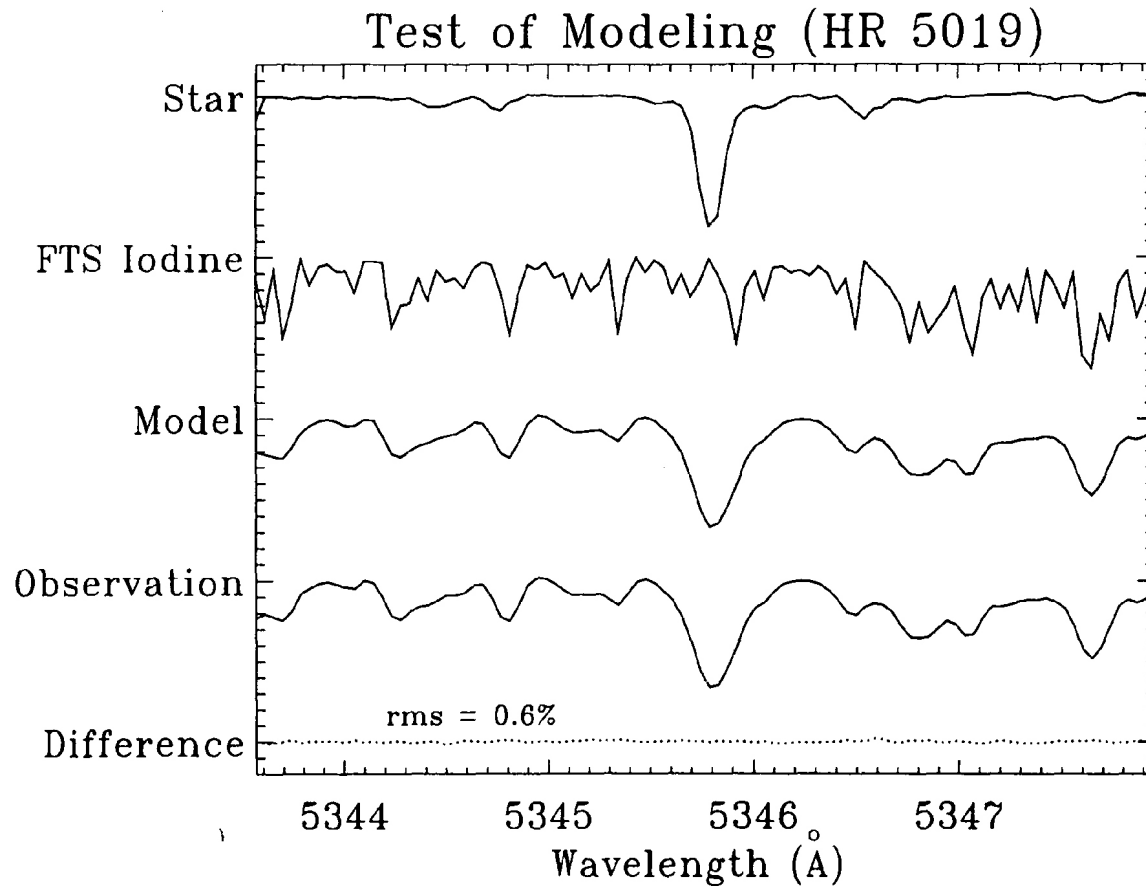


Ongoing work



Ongoing work

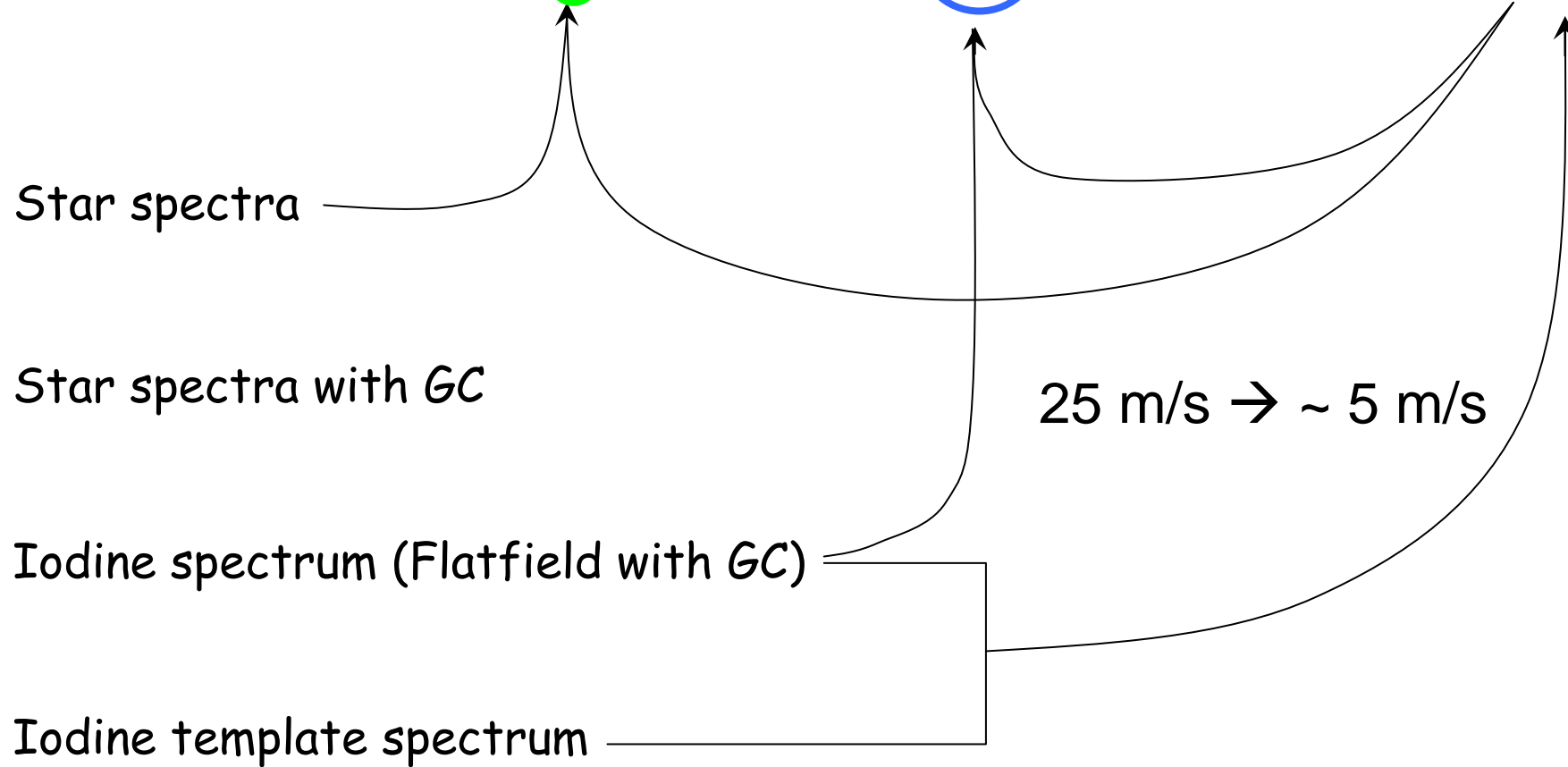
$$I_{\text{obs}}(\lambda) = k [I_s(\lambda + \Delta\lambda_s) T_{I_2}(\lambda + \Delta\lambda_{I_2})] \otimes \text{PSF}$$



Marcy & Butler, 1992

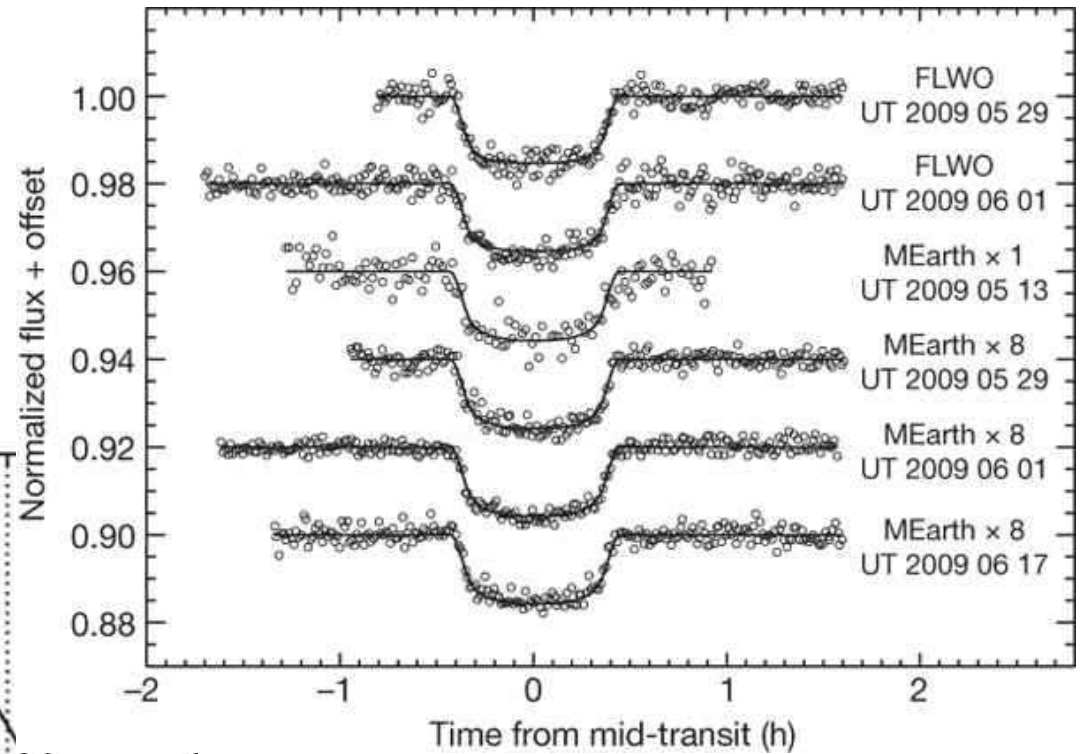
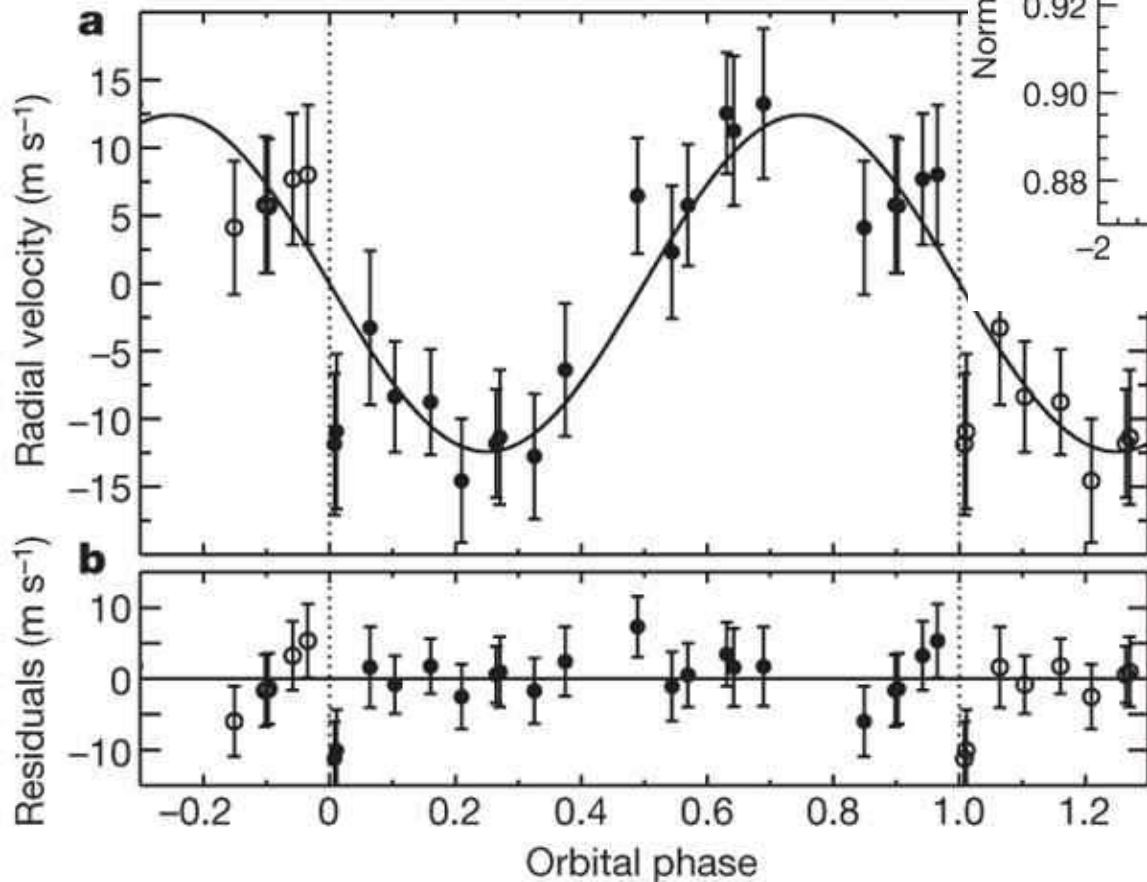
Ongoing work

$$I_{\text{obs}}(\lambda) = k [I_s(\lambda + \Delta\lambda_s) T_{\text{I}_2}(\lambda + \Delta\lambda_{\text{I}_2})] \otimes \text{PSF}$$



GJ1214: The "Super Earth"

Charbonneau, 2009



$P=1.58$ days
 $R_p=2.678 R_e$
 $M_p=6.55 M_e$
 $K=12.2$ m/s
 $T_{sup}=393\div 555$ K

GJ1214: The "Super Earth"

M10-1-005

28/02/2010

7/3/2010

11/3/2010

15/3/2010

19/3/2010

26/3/2010

28/3/2010

30/3/2010

M10-2-001

3/4/2010 11/5/2010 3/6/2010 3/7/2010

7/4/2010 15/5/2010 6/6/2010 7/7/2010

18/4/2010 19/5/2010 7/6/2010

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26/4/2010 26/5/2010 14/6/2010

30/5/2010 22/6/2010

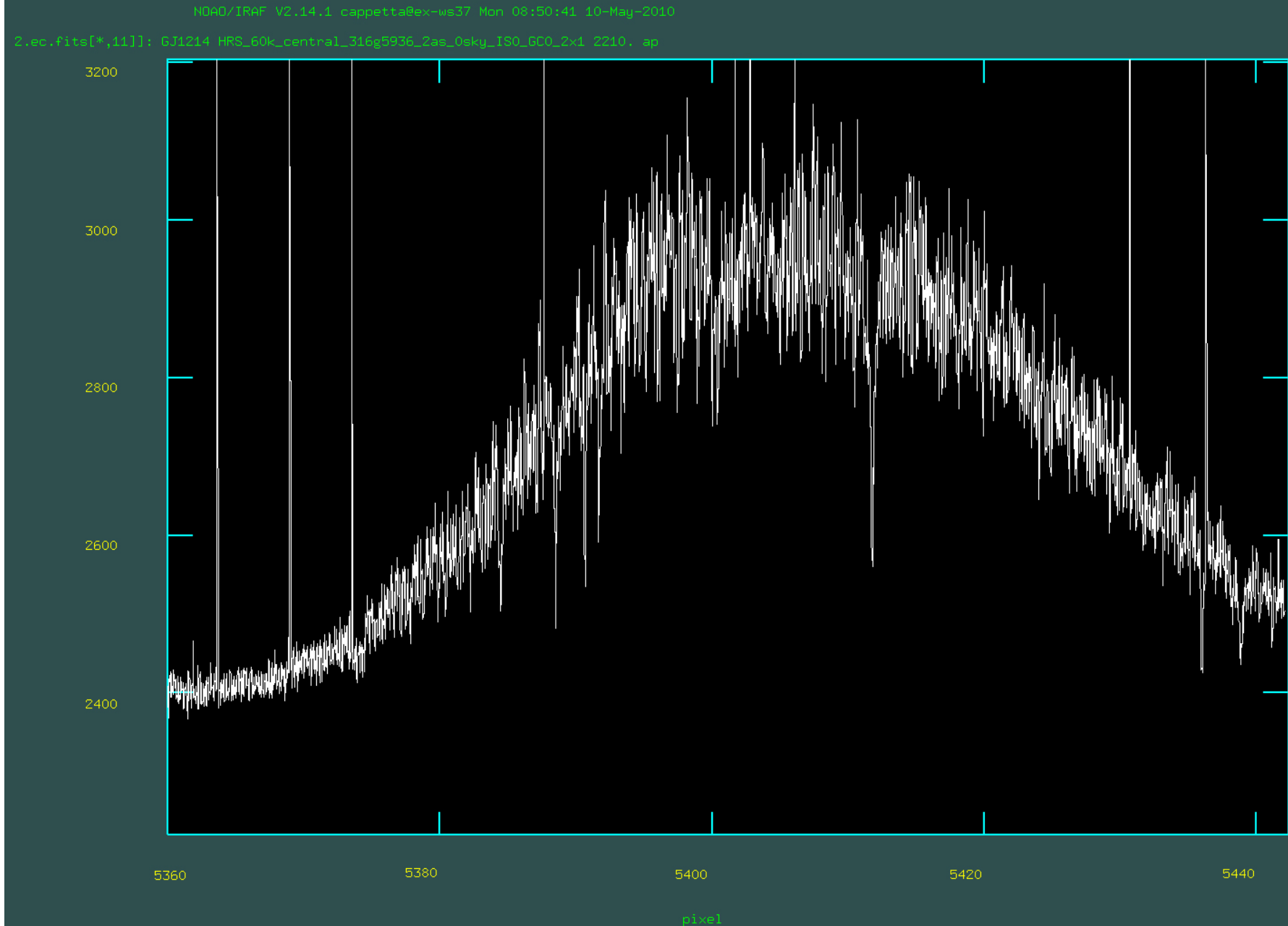
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25/6/2010

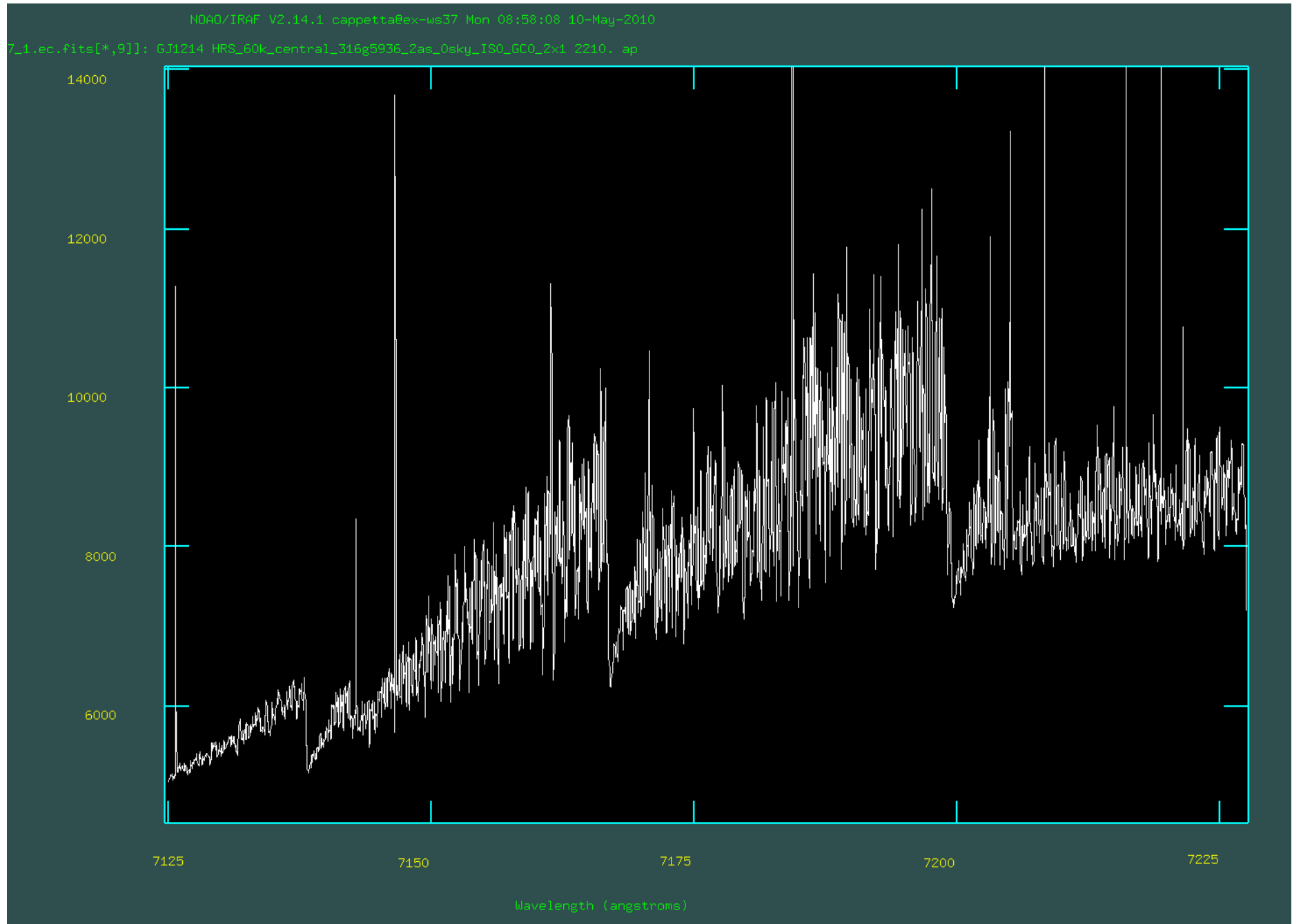
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30/6/2010

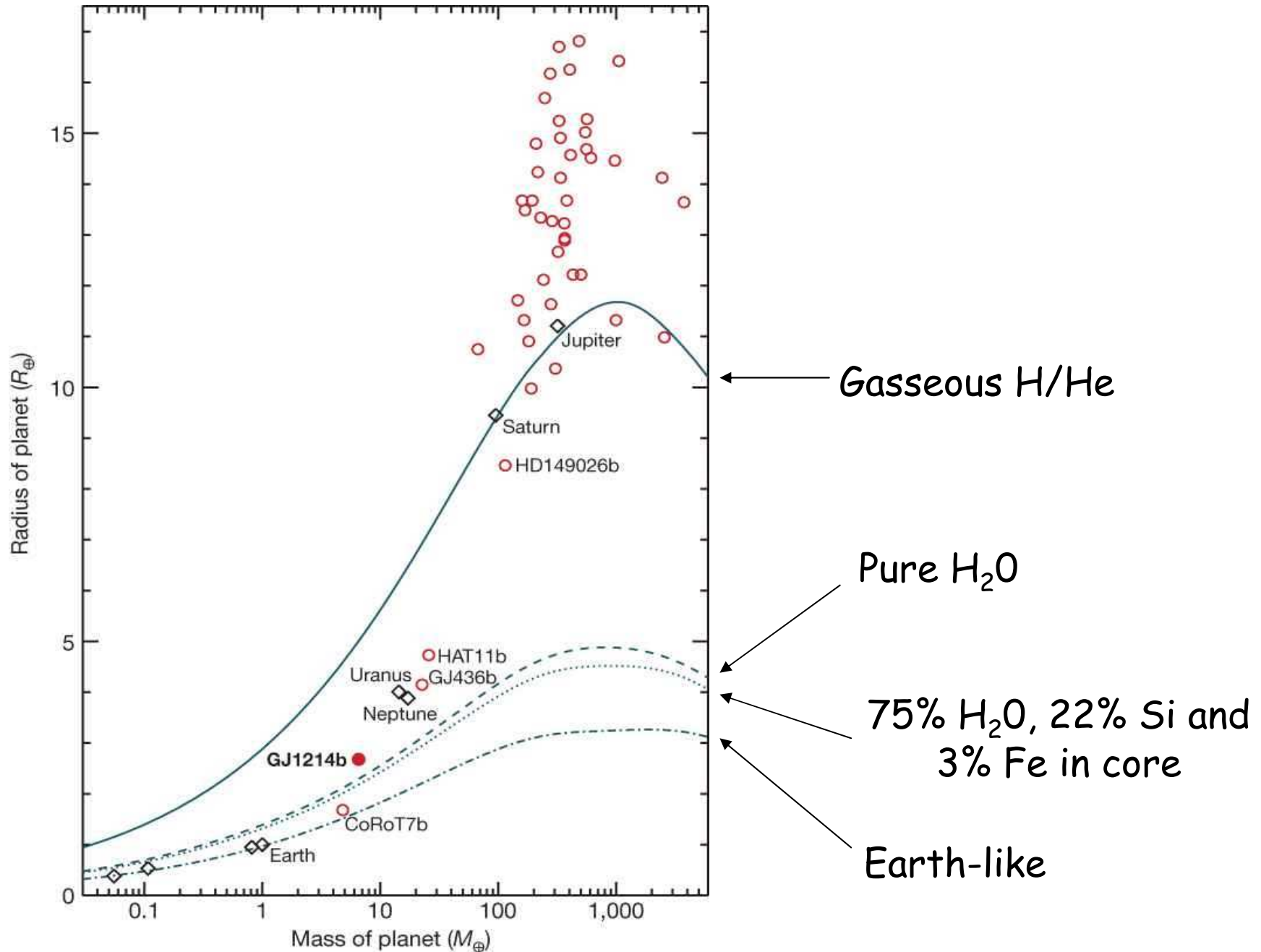
GJ1214: The "Super Earth"



GJ1214: The "Super Earth"



GJ1214: The "Super Earth"



Thank you for your time

Marcy G. W. & Buttler R.P., PASP 104, 270. 1992

Charbonneau D., Nature 462, 891. 2009

