Leibniz-Institut für Astrophysik Potsdam
AIP

Spectangular – spectral disentangling for detailed chemical analysis of binaries
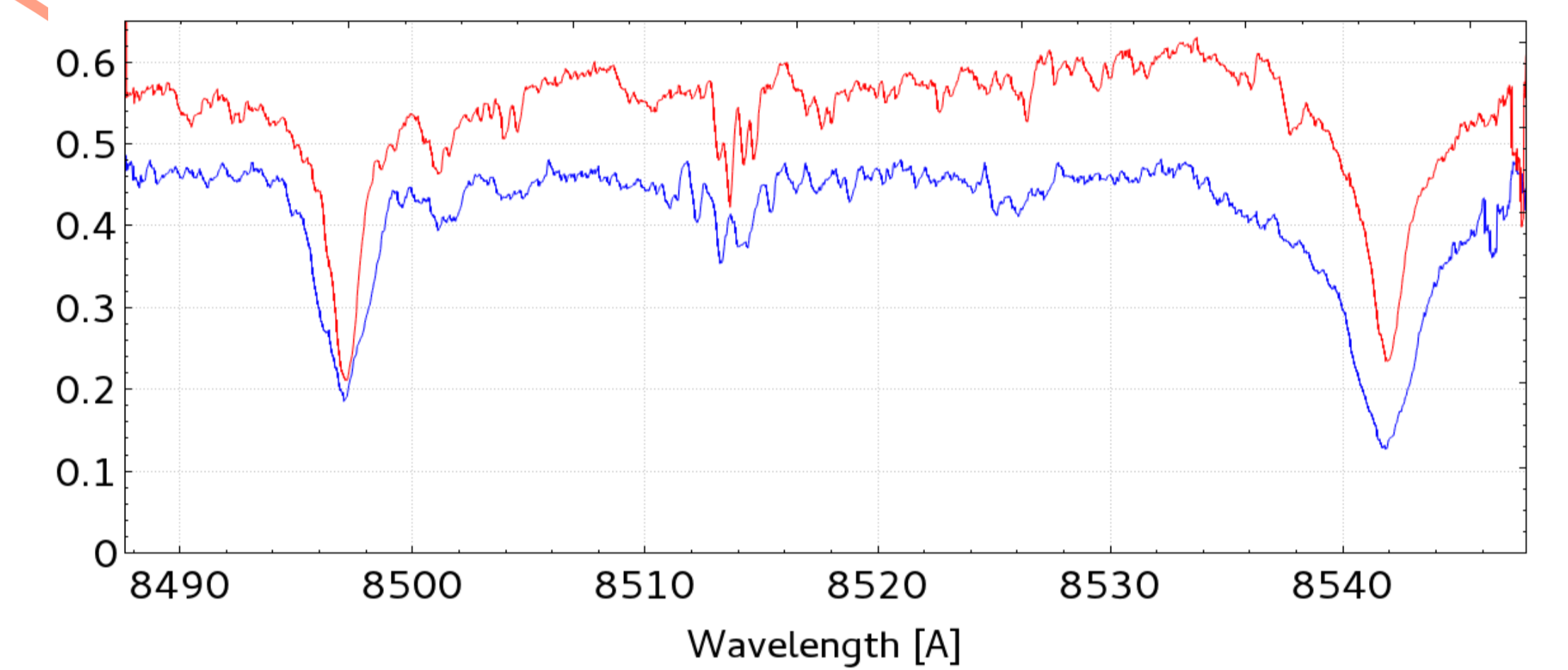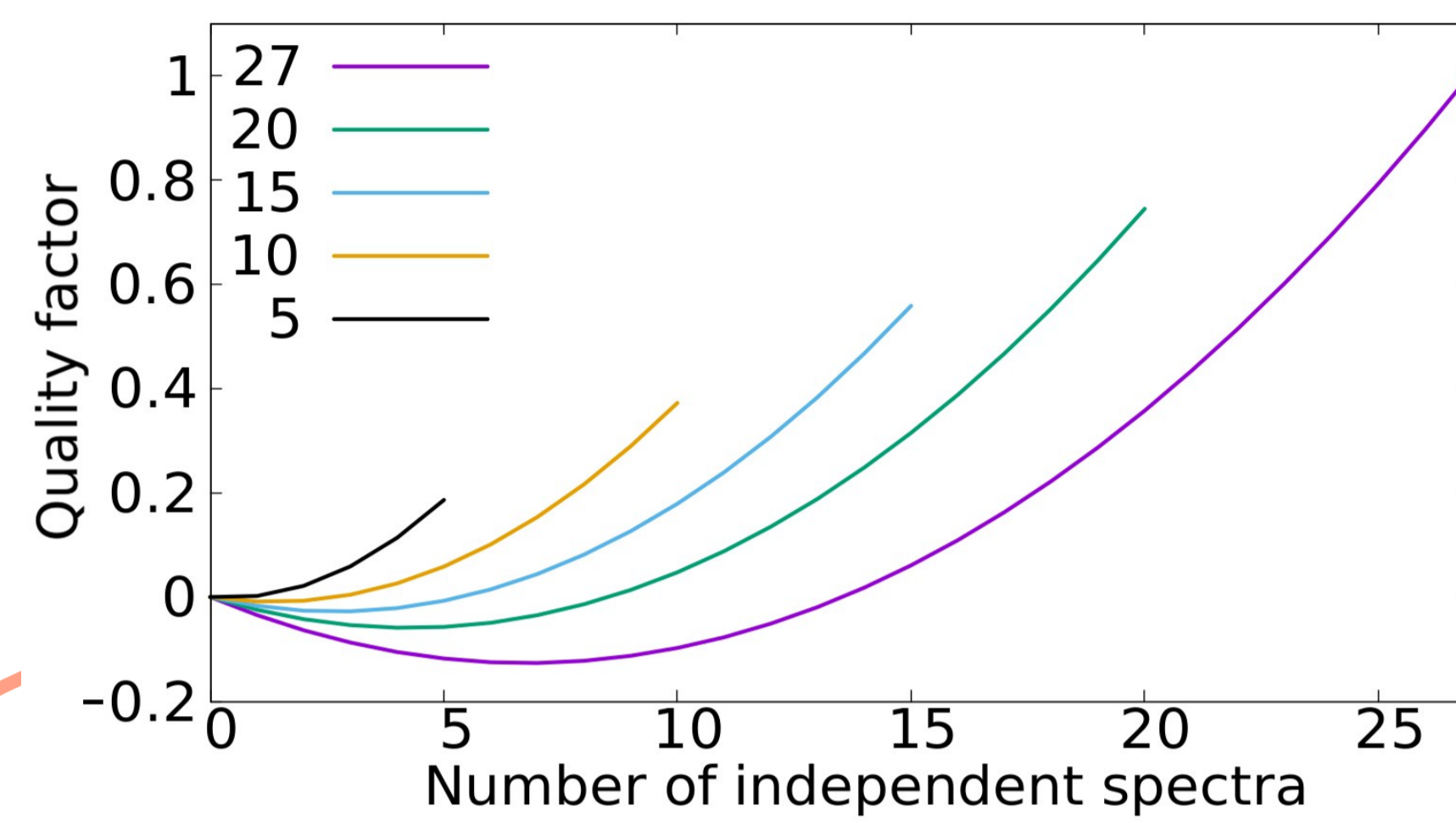
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Disentangling of spectra helps to improve the orbit parameters and allows detailed chemical analysis. Spectangular is a GUI program written in C++ for spectral disentangling of spectra of SB1 and SB2 systems. It is based on singular value decomposition in the wavelength space and is coupled to an orbital solution. The results are the component spectra and the orbital parameters.
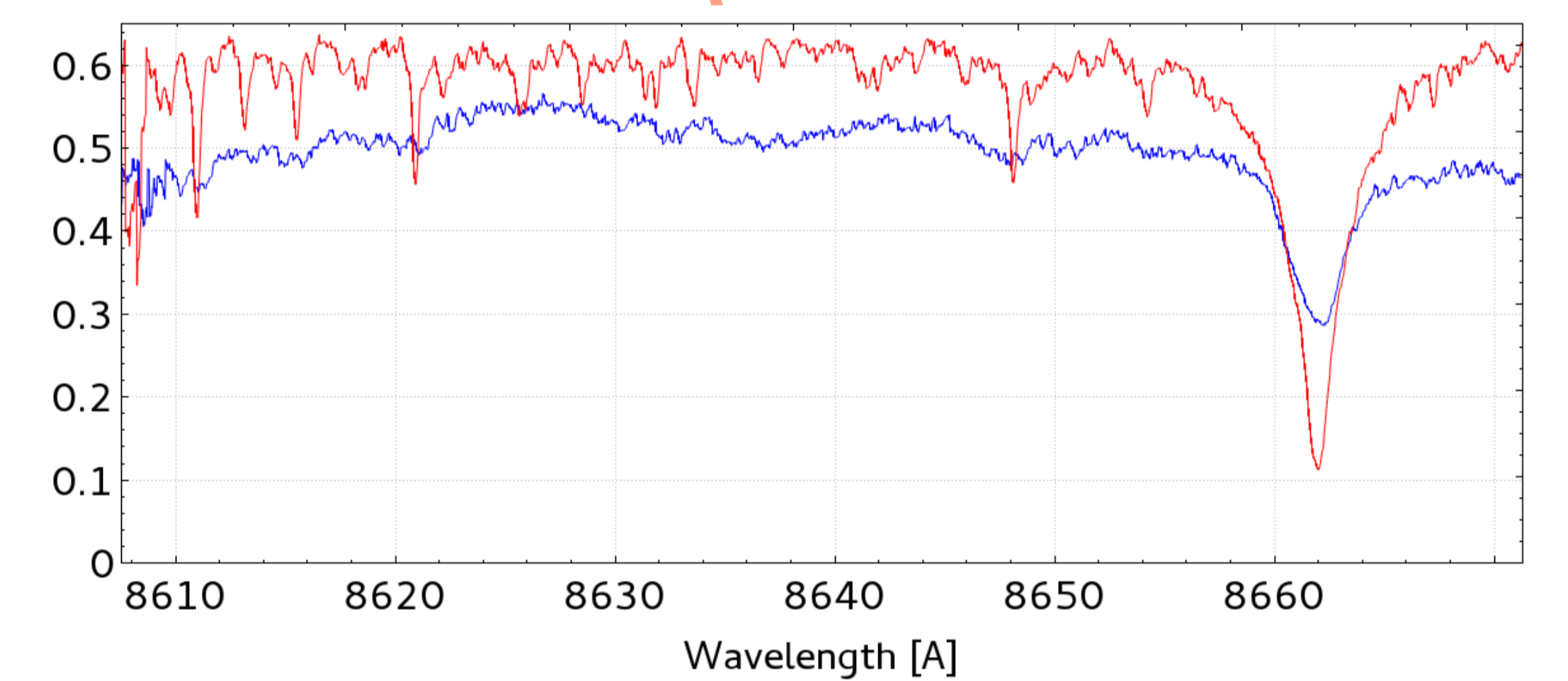
n observations: $\vec{o}=(\vec{o}_1\ldots\vec{o}_n)^t$

k components: $\vec{x}=(\vec{x}_1\ldots\vec{x}_k)^t$

to be solved: $\underline{M}\cdot\vec{x}=\vec{o}$

- Armadillo library for efficient matrix classes and SVD routines

- OpenBlas for parallel computing

- Qt for GUI

- Downhill-Simplex global optimisation on RV's or orbital elements
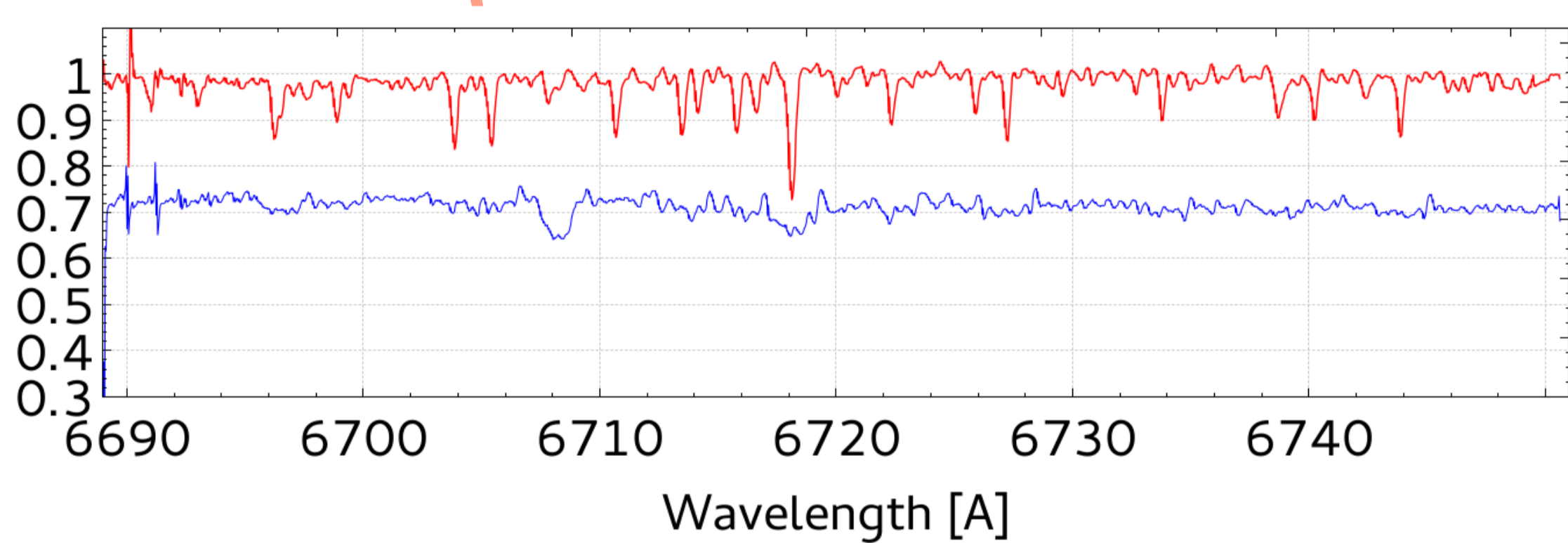

Data Preparation

Data need to be of similar quality (normalisation and SNR).
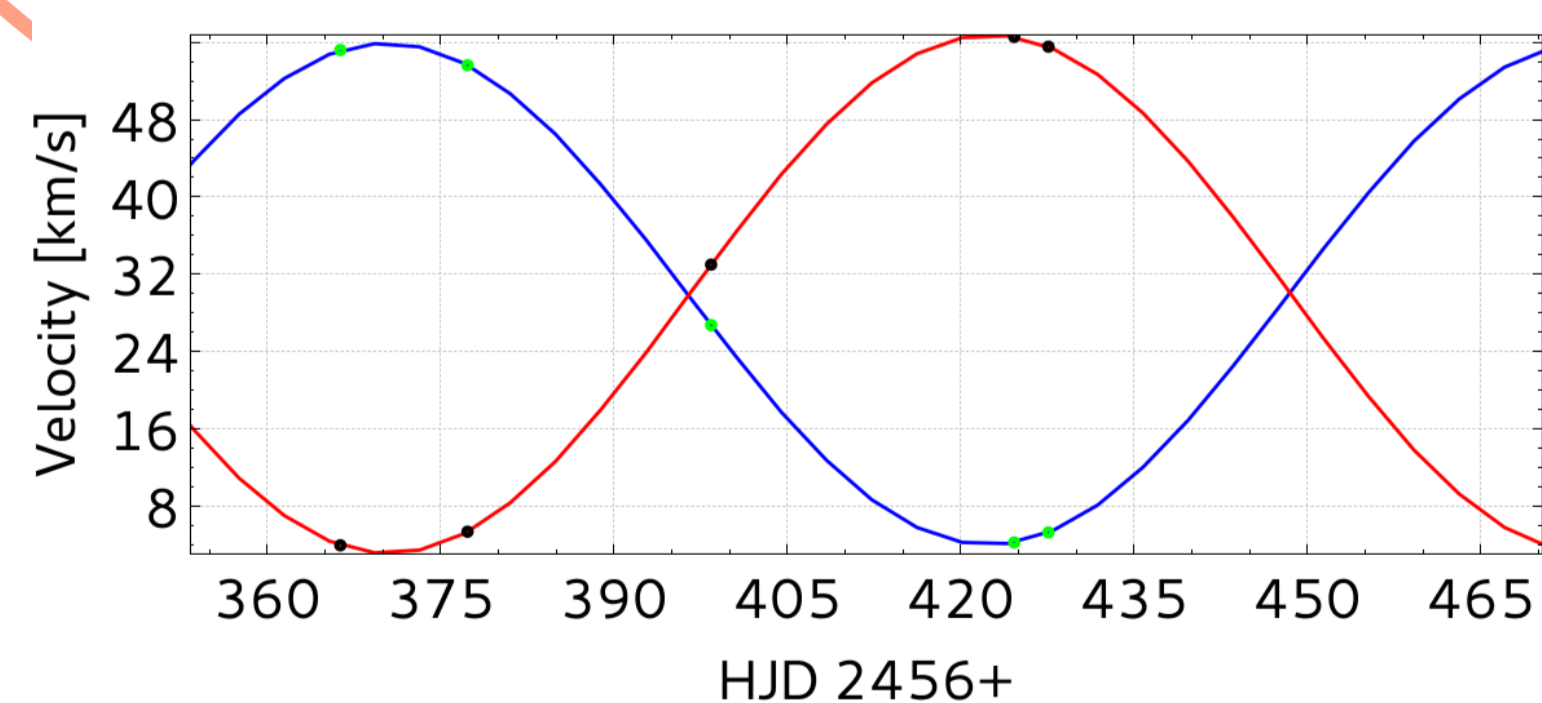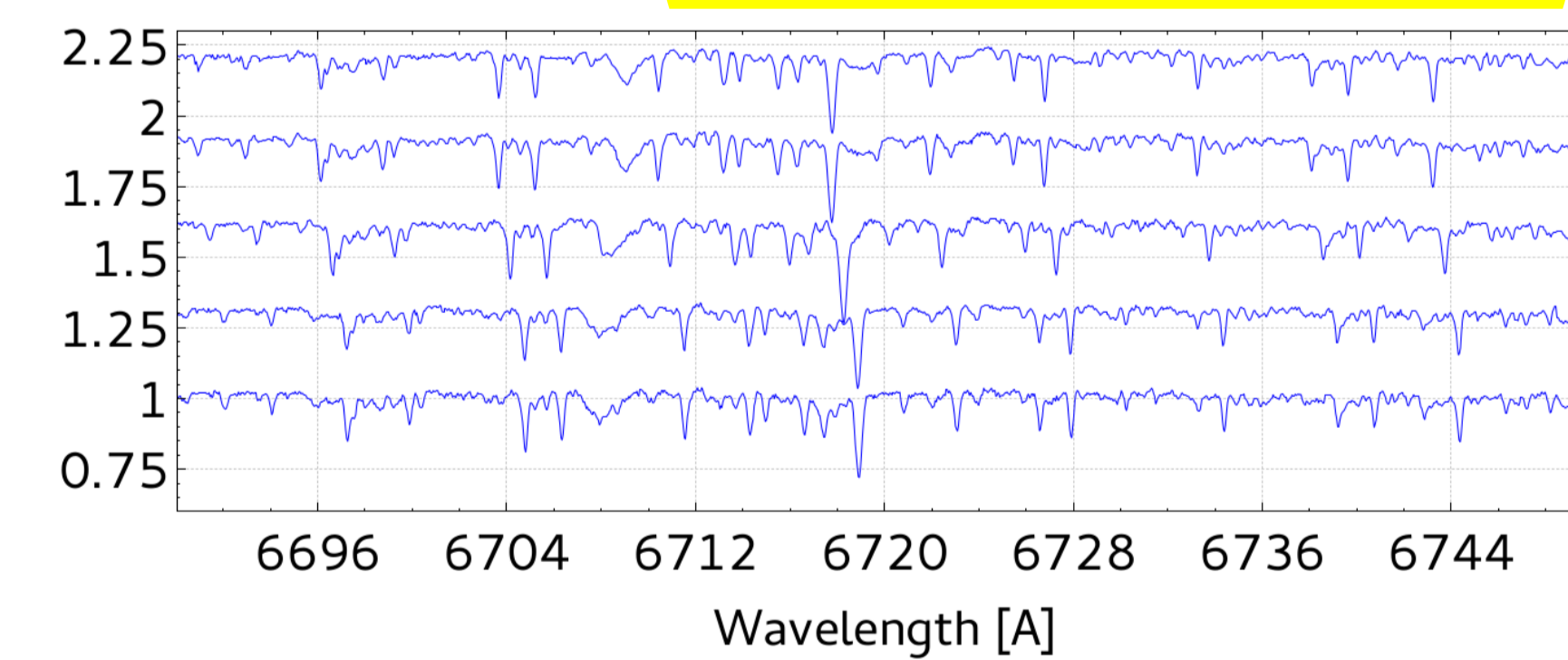
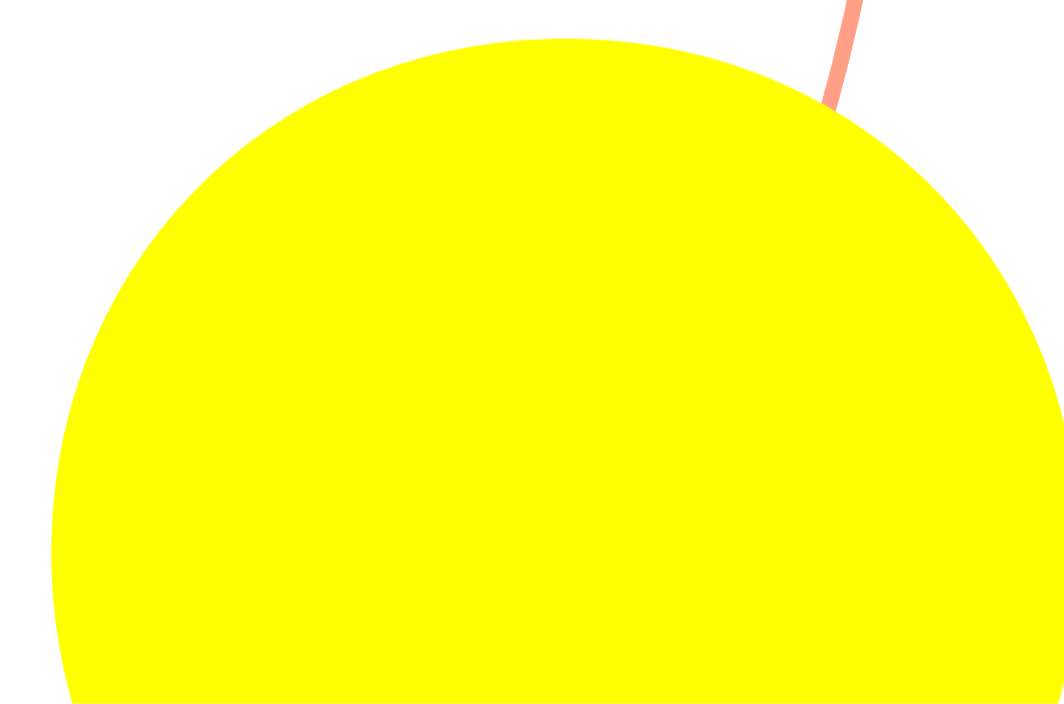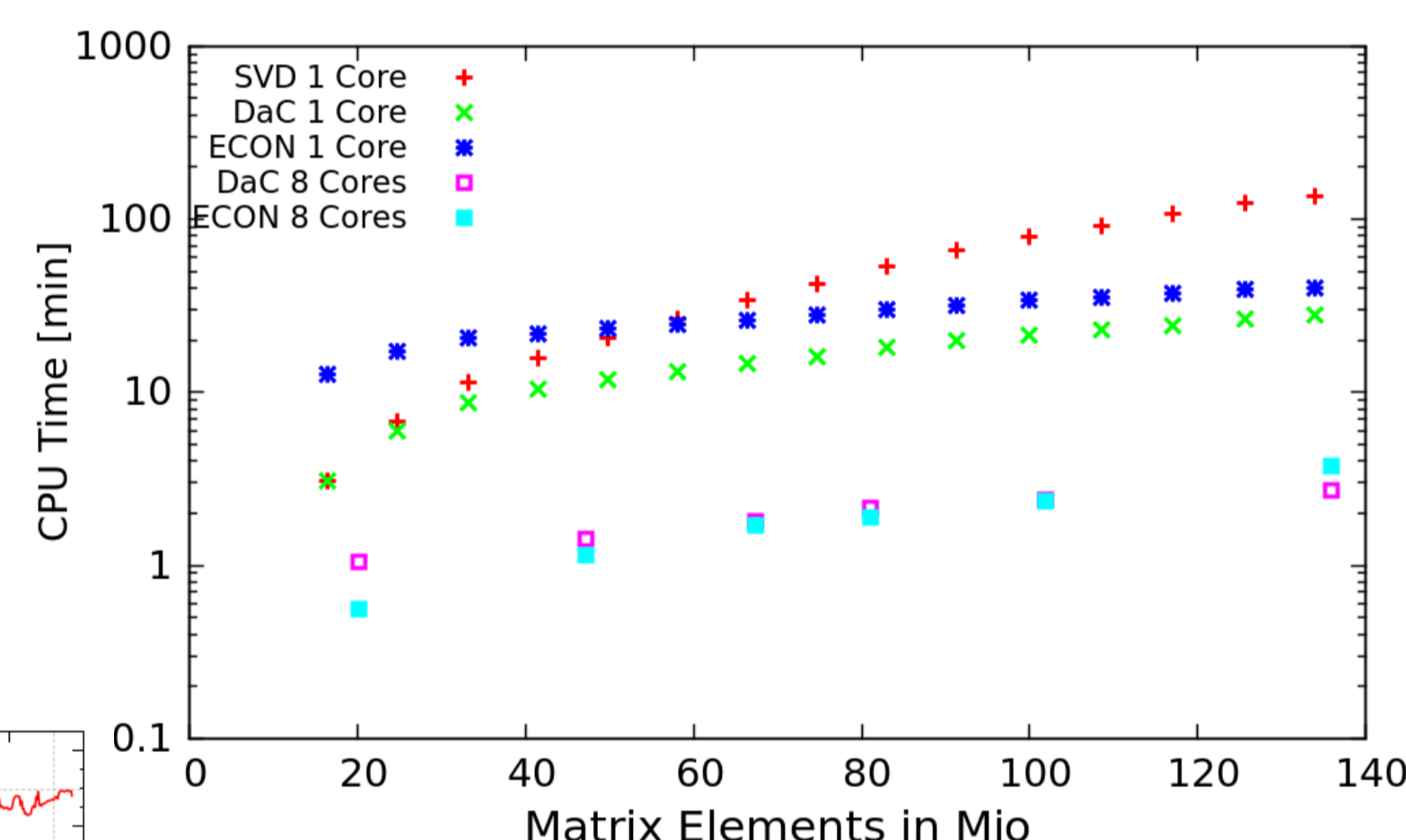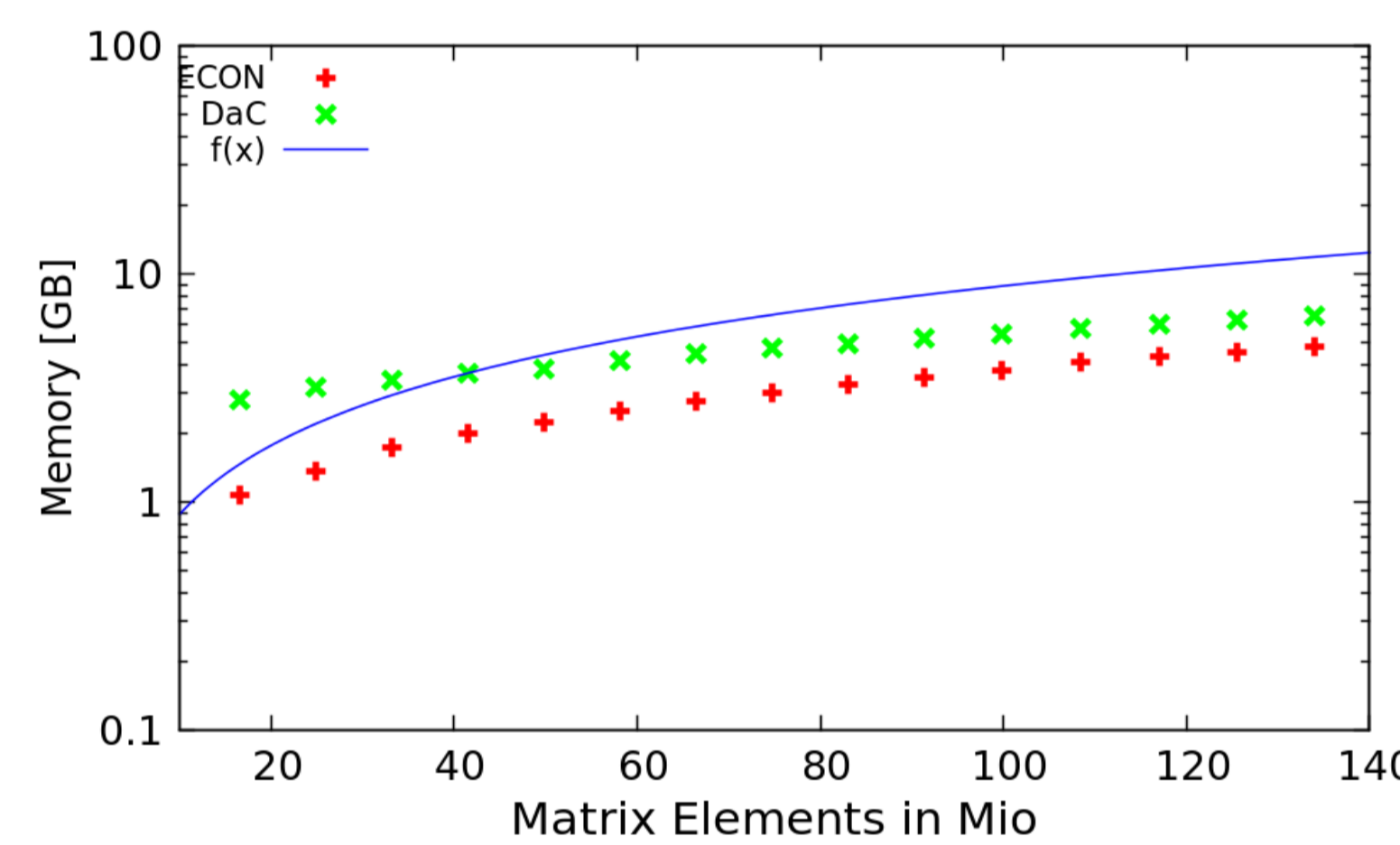Rebinning to logarithmic wavelength scale.

Quality factor should be used, if orbit is known, to plan observations.

Relative strengths of telluric features need to be measured.

Flux-ratios between components (during eclipse) need to be known.

Result for the minimum data requirements. Spectral region around the Li λ6708 line of Capella. Only three of five spectra used are independent.

Ca II NIR triplet Capella (G8III + G0III), $v\sin(\mathbf{i})$ = 4.1/35

Telluric Features