

PySME

Spectroscopy Made Easier

sme.astro.uu.se



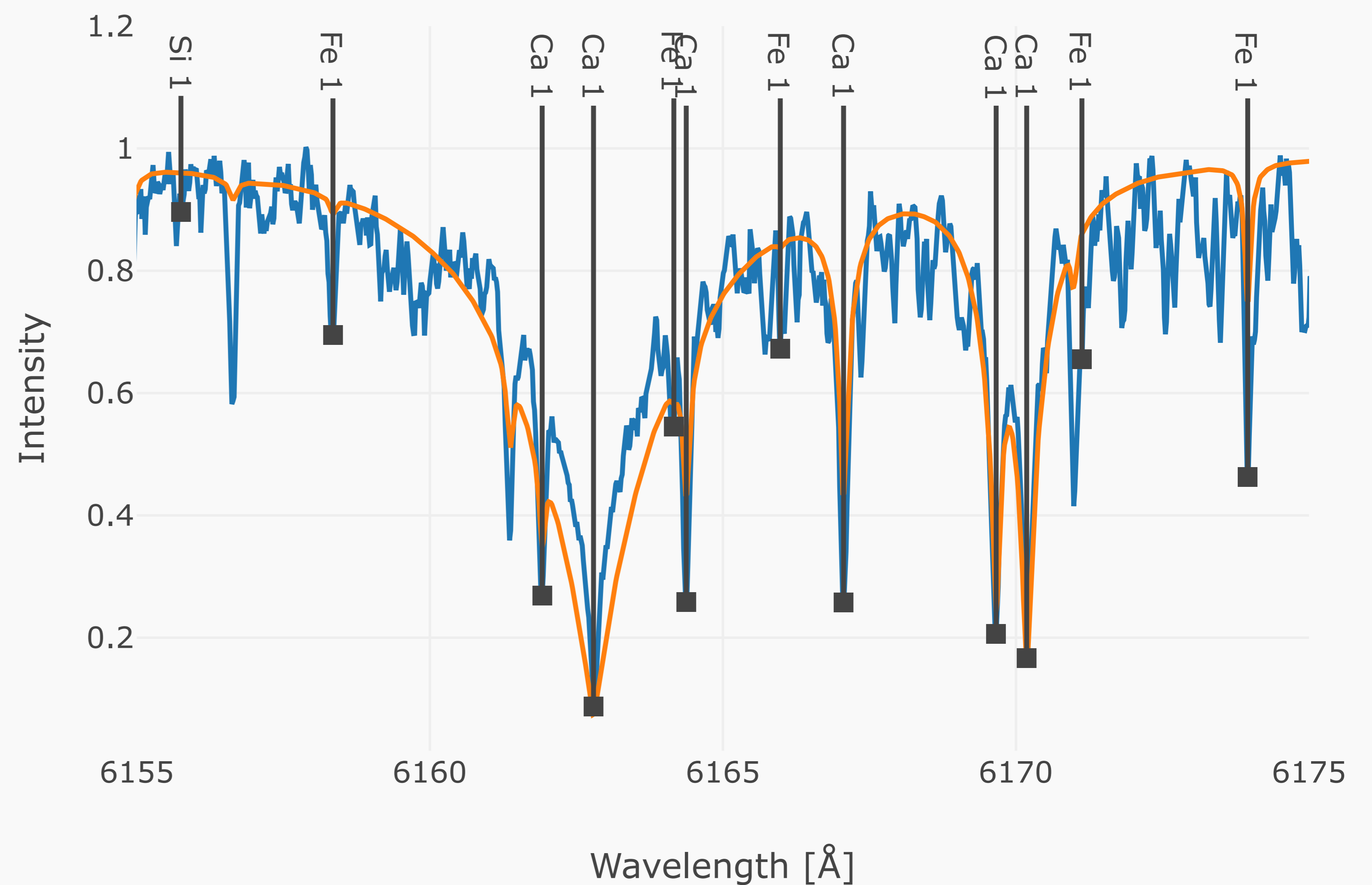
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Introduction

Over 20 years ago Valenti & Piskunov developed the spectral synthesis library Spectroscopy made easy (SME)[1] to simplify spectral analysis, and it has been used in hundreds of works since.

PySME is a new Python frontend to the same library, developed with the same goal in mind: Making spectroscopy easier for everyone.

PySME creates accurate, high-resolution synthetic spectra, based on a wide range of stellar parameters, a linelist and a model atmosphere. It can also be used the other way around. Give PySME an observation and it will determine the best fit stellar parameters for that spectrum.



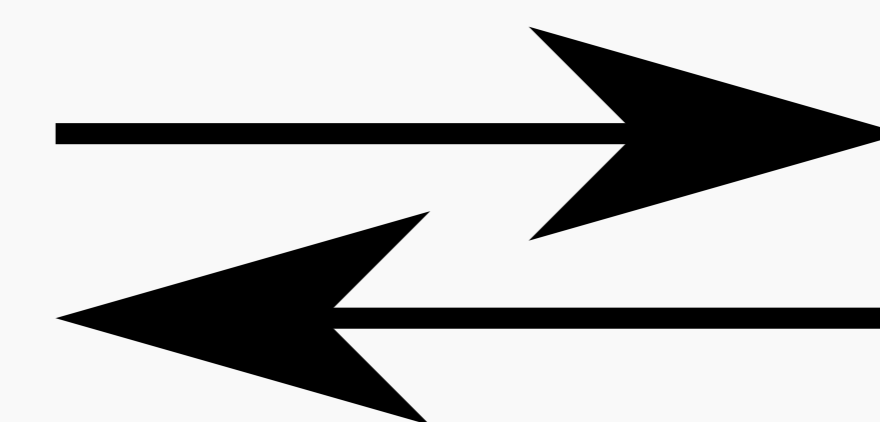
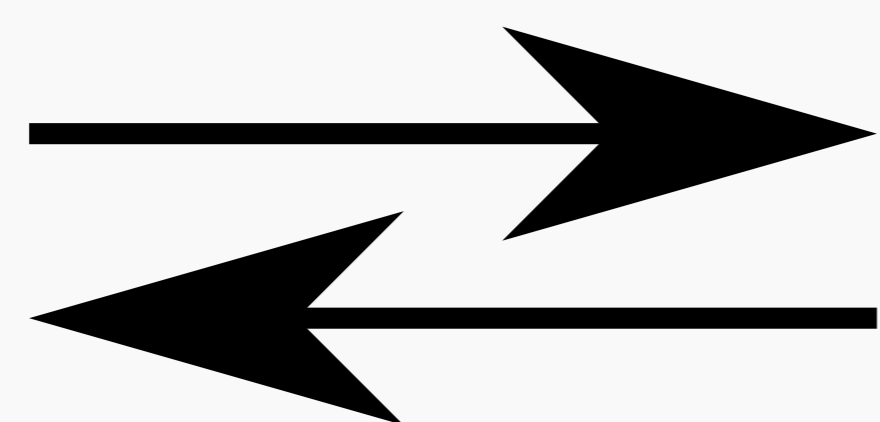
The best fit synthetic spectrum (orange) to an observation (blue) of K2-3 with LaSilla/HARPS.

— Synthetic
— Observation

Features

- Full access to the powerful SME library with Python
- Use advanced functionalities like NLTE calculations
- Import linelists from VALD [2]
- Backwards compatible with existing IDL Structures
- Parallelize your Code, by running several PySME threads at the same time
- Use Python tools for your analysis
- Free and Open Source

Temperature
Surface Gravity
Metallicity
...



Parameters

PySME

Spectrum

References:

- [1] Valenti, J. A. and N. Piskunov (1996). "Spectroscopy made easy: A new tool for fitting observations with synthetic spectra." In: *Astronomy and Astrophysics Supplement* 118, pp. 595-603
- [2] Ryabchikova, T. et al. (2015). "A major upgrade of the VALD database". In: *Physica Scripta* 90.5, 054005, p. 054005.
DOI: 10.1088/0031-8949/90/5/054005

PyReduce

A Data Reduction Pipeline for Echelle Spectrographs

PyReduce is the new and improved version of REDUCE, now rewritten in Python. It creates wavelength calibrated and continuum normalized 1D spectra, based on raw observation images from various instruments. From high resolution instruments like HARPS, to low resolution observations with the JWST.

This makes it the perfect companion tool to SME. Reduce your observations with PyREDUCE then analyse them with PySME.