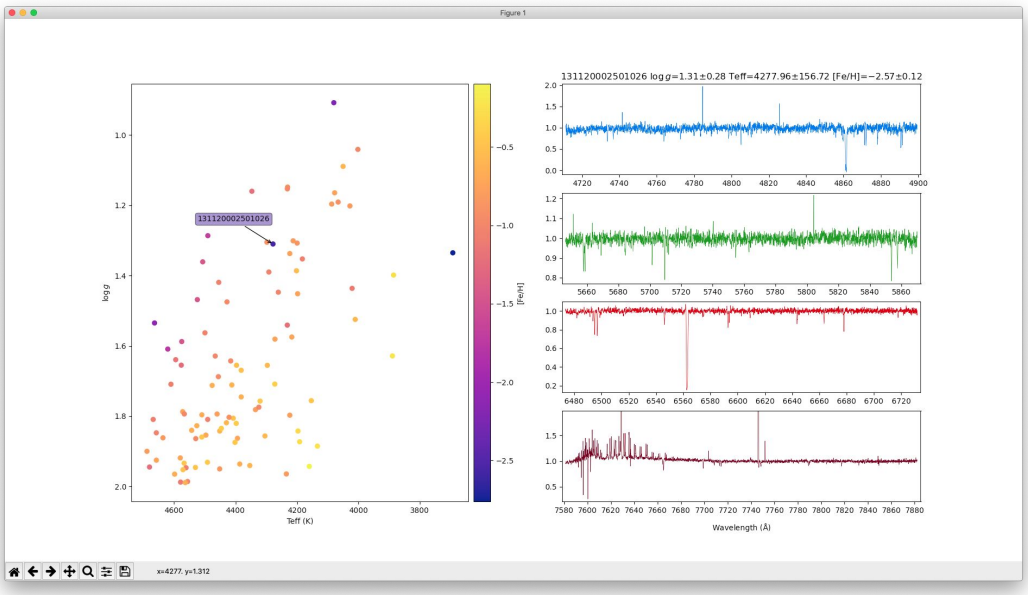
The use of Specutils by Data Central

Specutils is an Astropy coordinated package which provides a consistent interface to astronomical spectra (primarily 1D). As Specutils can be adapted to parse spectra in many different formats, Specutils plays a key role at Data Central, allowing us to handle the diverse formats provided to us by survey teams. In this poster, I cover what Specutils is, how it works, how Data Central uses it, and why you too should use and contribute to it.

Specutils is an Astropy coordinated python package, that is, it is centrally maintained by the Astropy Project. Specutils provides three key classes: Spectrum1D, SpectrumCollection, and SpectrumList; these are built on core Astropy classes, allowing the usual interaction with arithmetic, slicing and units.

Specutils provides numerous routines that consume these classes, providing such features as: line and continuum fitting; smoothing, convolution and resampling; template matching and uncertainty estimation; and reddening of model spectra.

Specutils also ties into the Astropy IO registry system, providing a user-friendly interface to read and write the various formats spectra are stored in. There is support for more generic formats such as ASCII tables or CSV, but also for more specific formats such as IRAF's FITS, and instrument or survey-specific formats such as HST, Subaru, SDSS and MaNGA.



Example Application for browsing GALAH spectra: https://docs.datacentral.org.au/help-center/virtual-observatory-examples/ssa-galah-dr3-interactive-spectra-explorer-enhanced-data-central-api/

Data Central has added and continues to add support for reading spectra from both the hosted surveys and the telescope archives stored at Data Central. We do this for two reasons:

1. This reduces the barrier to entry to using this existing data, especially data from older surveys where the data format may have incorrect FITS WCS or where the format varies across the whole survey.
2. Data Central can build common tools to analyse and visualise this spectra, rather than needing to build bespoke tools, modify the original data, or limit ourselves to specific formats. Given Data Central hosts a number of legacy surveys from the Anglo-Australian Telescope, this ability to adapt to different formats but provide the same interface is vital for us.

Contributing to Specutils is done in the same way as other Astropy projects: there is a GitHub repository to which you can send Pull Requests. The Astropy provides detailed contribution instructions in case you are not yet familiar with the contribution process.

We strongly encourage those who host spectra, especially those who existing infrastructure is built on top of Python, to contribute support for your spectra: this will reduce the barrier to Astronomers to using your data, and the contribution process to Specutils is not onerous.

References:

The Astropy Project: https://www.astropy.org/

Specutils: https://specutils.readthedocs.io/

Data Central: https://datacentral.org.au

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