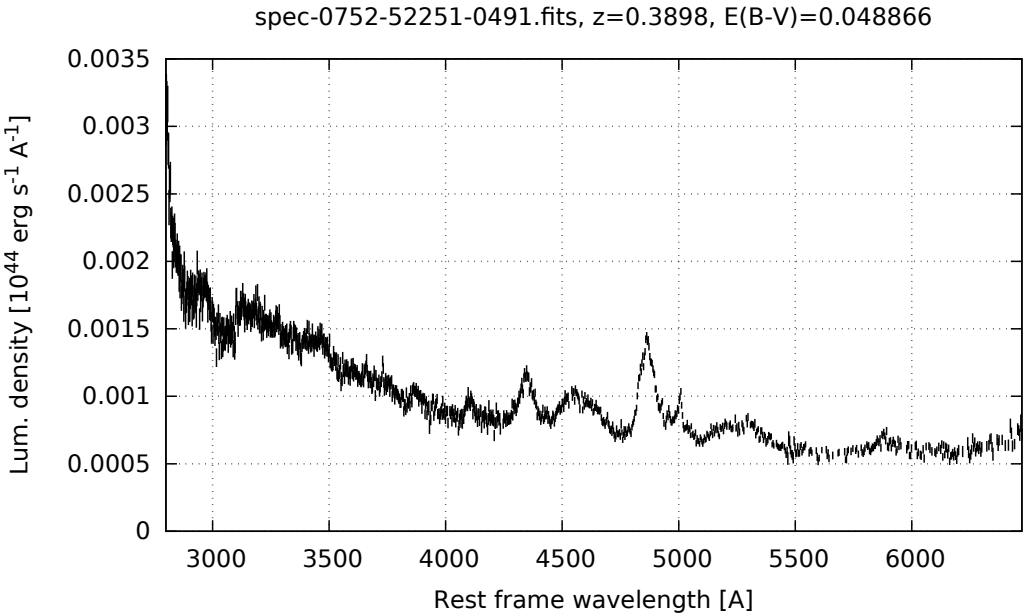
The challenge: automatic spectral analysis of $\sim 10^5$ sources



Quantities to estimate:

- continuum luminosity and slope (shape?);
- host galaxy contribution;
- iron luminosity and width;
- Emission lines:
  - luminosity;
  - width (profile?);
  - velocity offset;

QSFit: automatic Automatic analysis of optical AGN spectra

- quick ($\sim$8 s per spectrum);
- standardized recipe;
- ensure replicability and shareability;
- written in IDL;
- based on MPFIT;
- released as free software (GPL).

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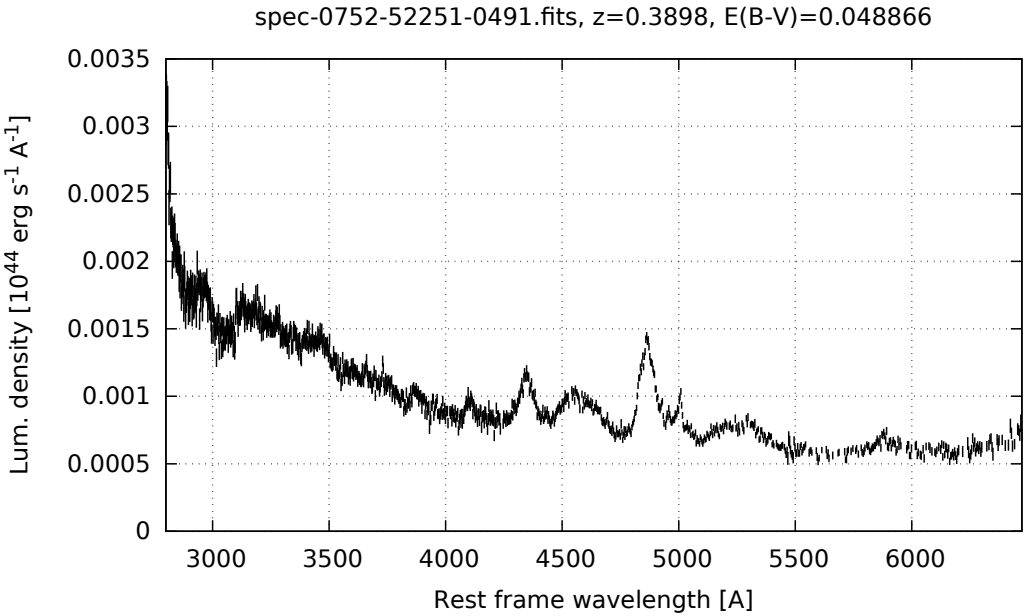

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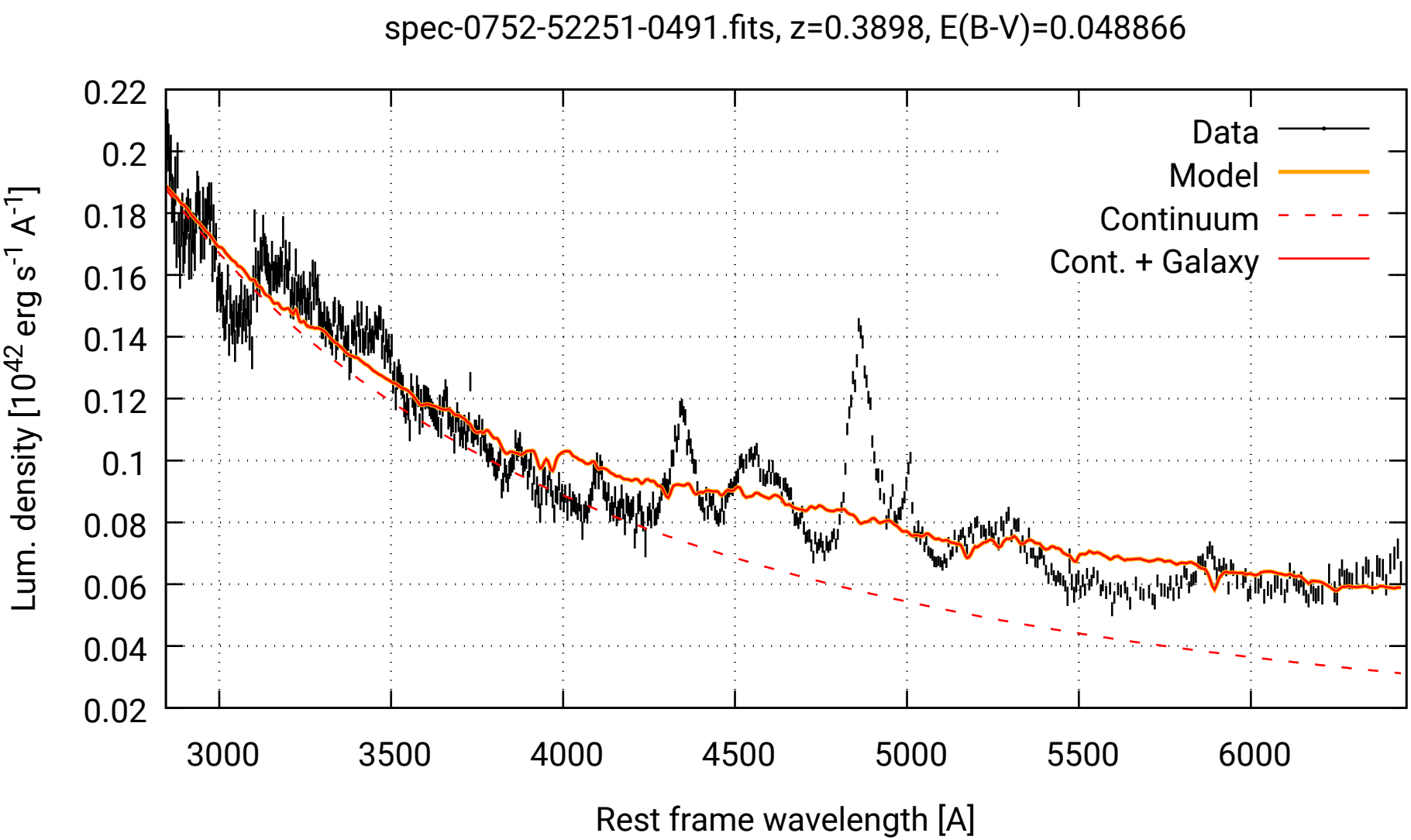

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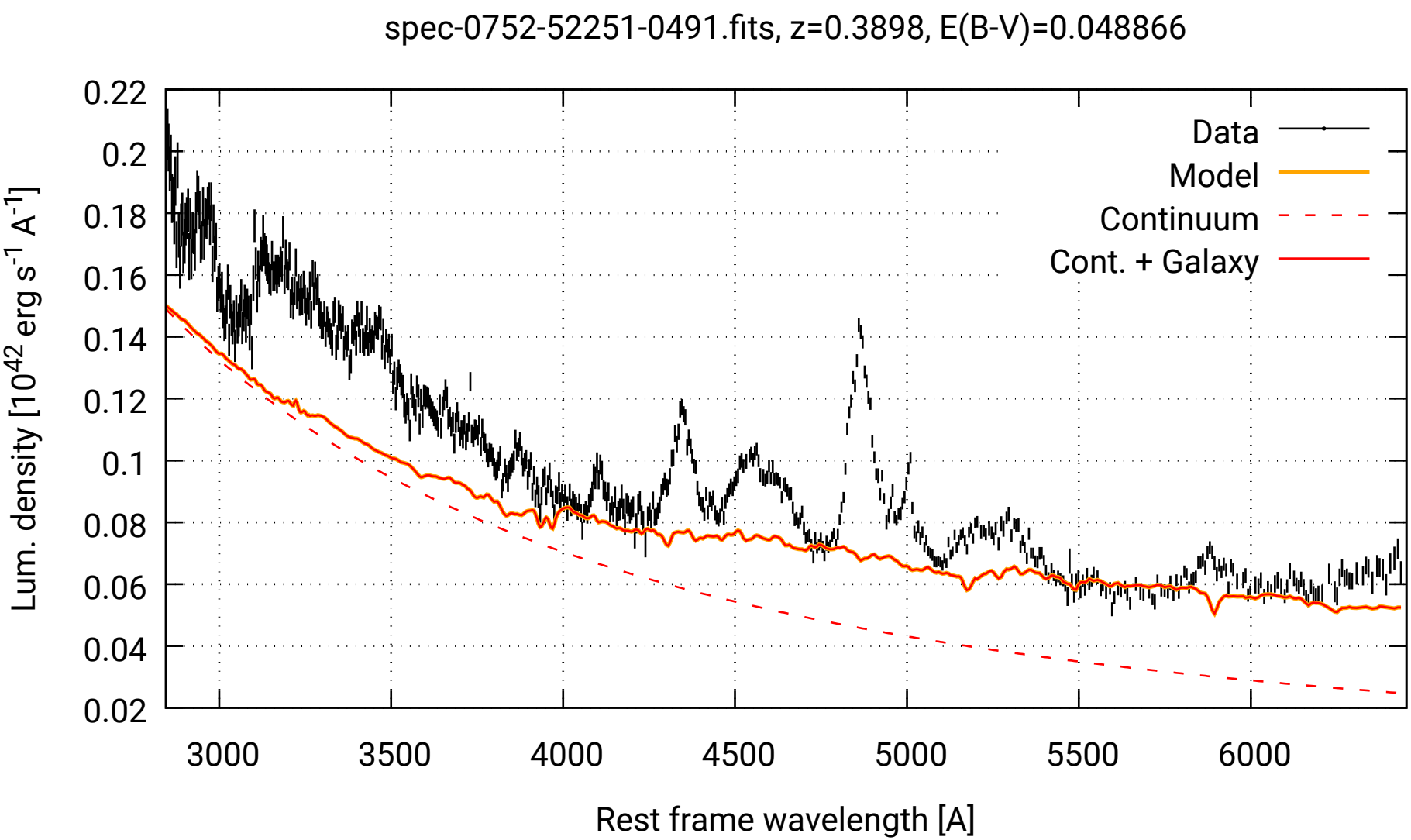

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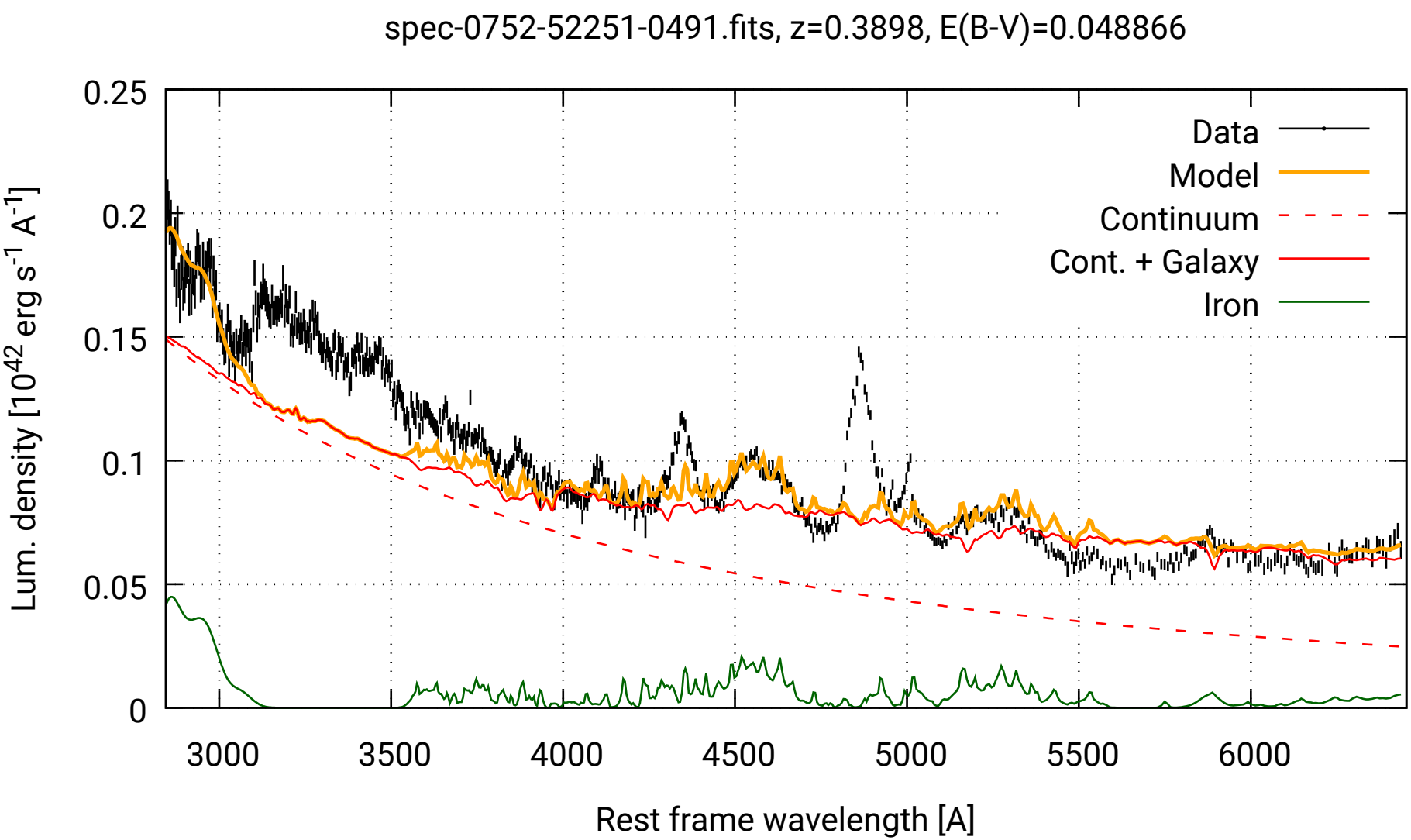

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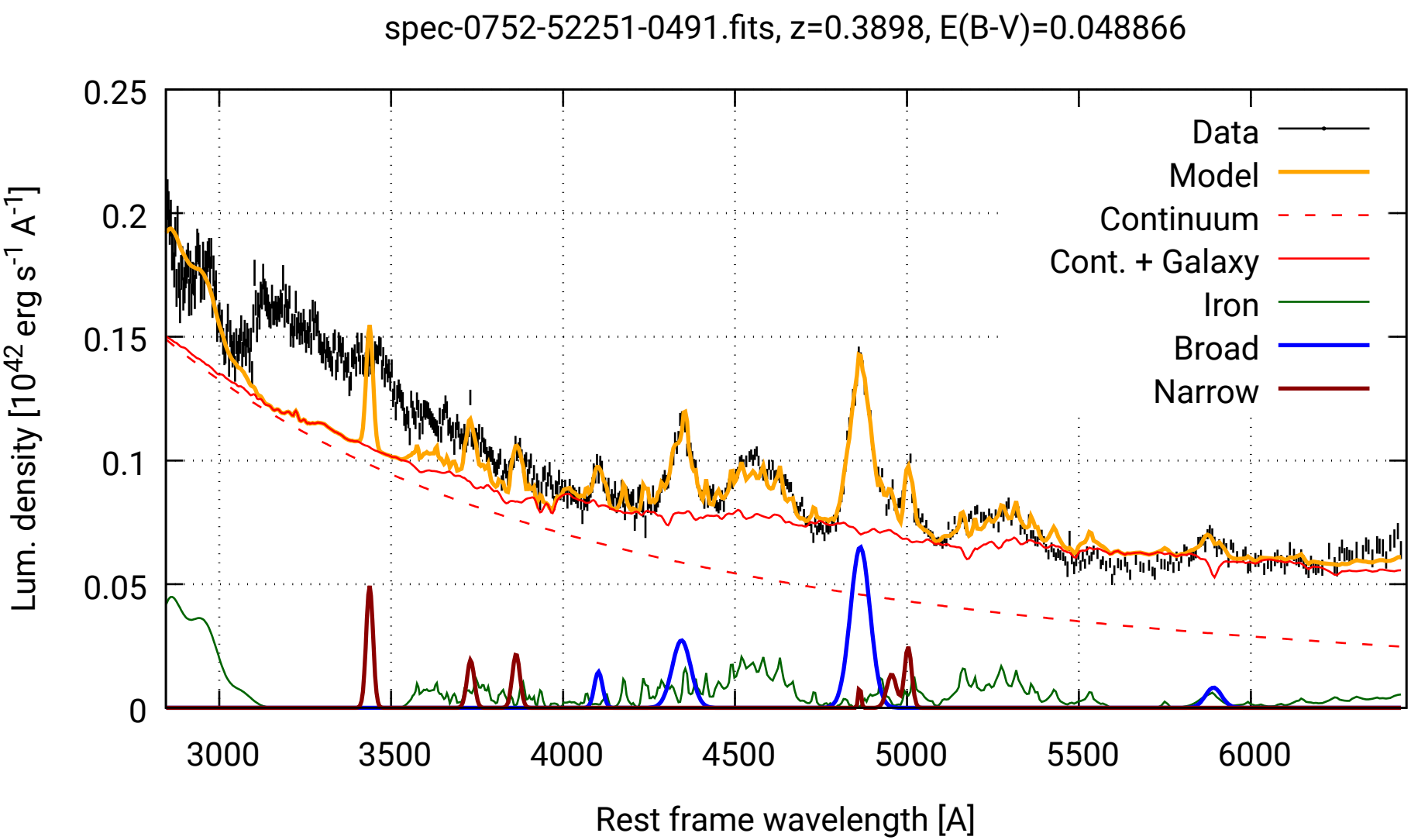

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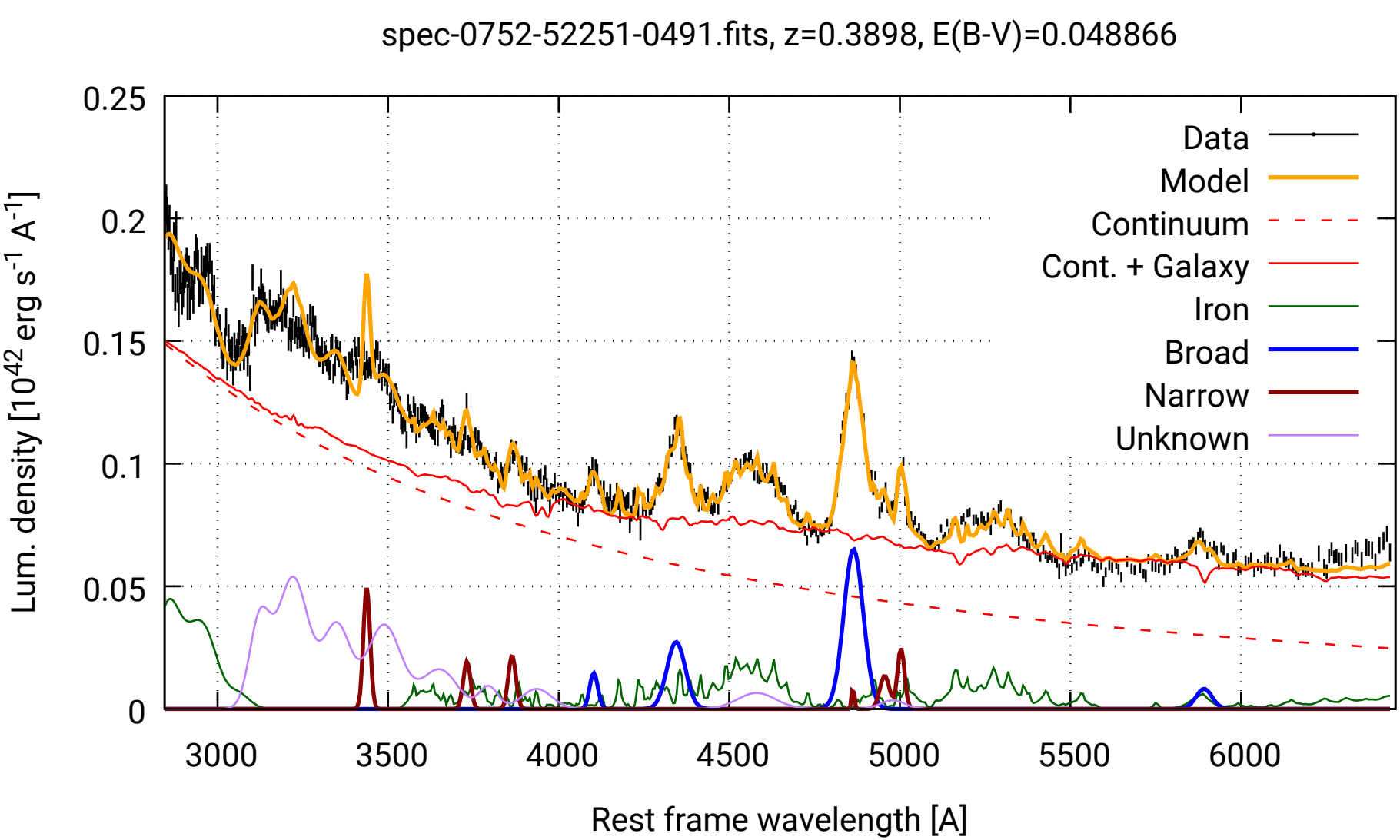

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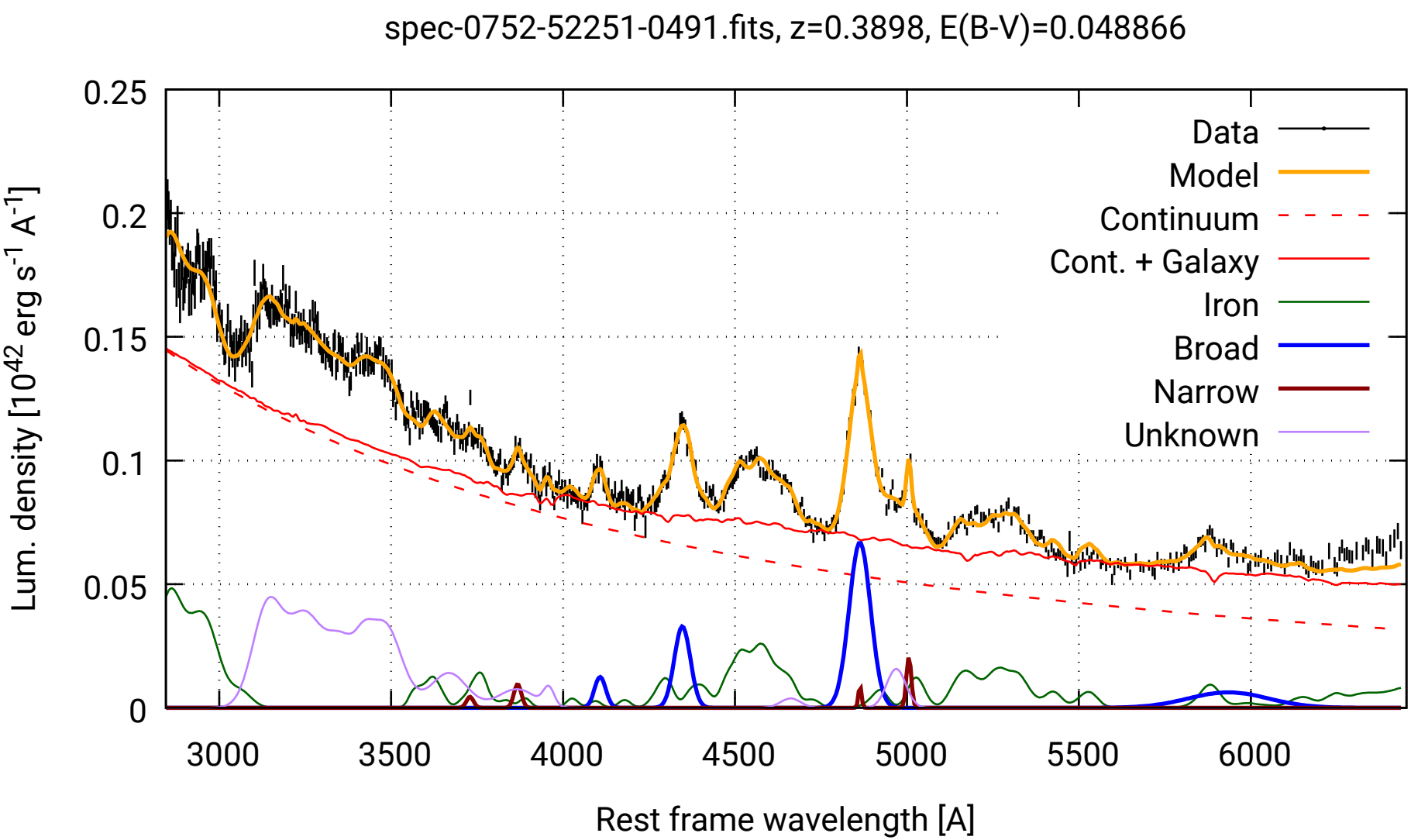

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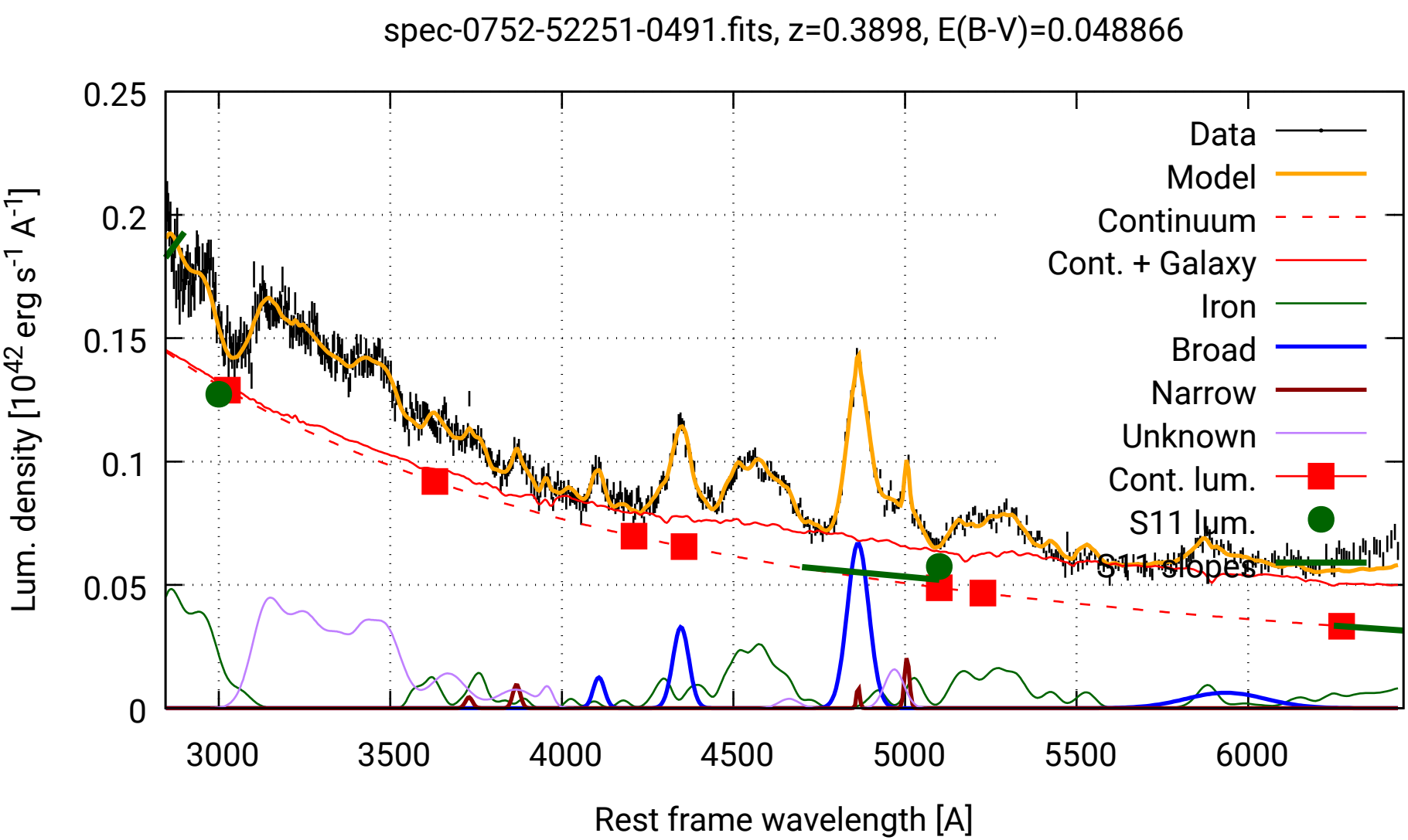

The QSFit website: http://qsfit.inaf.it/

QSFit - Quasar Spectral FITting package

QSFit is a software package to automatically perform spectral analysis of Active Galactic Nuclei (AGN) optical/UV spectra. It provides estimates of:

- AGN continuum luminosities and slopes at several rest frame wavelengths;
- host galaxy luminosities (for sources with z < 0.8);
- luminosities, widths and velocity offsets of 20 emission lines (Hα, Hβ, MgII, [OIII], CIV, etc.);
- luminosities of iron blended lines at optical and UV wavelengths;
- several "quality flags" to assess the reliability of the results.

The main purpose of QSFit is to allow anyone to perform AGN spectral analysis in a simple, replicable and shareable way. The code is available on Github and can be easily customized for specific purposes.

Reference Paper

The paper has been submitted to MNRAS. You can download a draft from arXiv.

Cite as: Calderone et al., 2016, arXiv:1612.01580

Source Code (Github)

The source code can be downloaded from **Github**. The software is written in IDL and released under the GPL license. The prerequisites to run QSFit are IDL (ver. >= 8.1) and Gnuplot (ver. >= 5.0).

To run QSFit you should download and unzip the package from Github, then change to the directory where you unpacked the source code and start an IDL session. There is no need to change the IDL PATH system variable, QSFit provide a simple way to compile all the required procedures: simply call `compile` at the IDL prompt.

The QSFit package already comes with a SDSS DR-10 FITS file to test the code. The commands to run the analysis and plot the results are:

```
res = qsfit('data/spec-0752-52251-0323.fits', z=0.3806, ebv=0.06846)
qsfit_plot, res
```

Further informations may be found in Appendix B of the reference paper (arXiv)

Catalog of spectral properties (ver. 1.0)

NOTE: a modern browser is required to navigate the catalog website.

We used QSFit to analyze 71,251 optical spectra (from SDSS-DR10) of Type 1 AGN at z < 2, and compiled a catalog of spectral properties. The reference paper can be found here.

The catalog can be **explored online** or downloaded as a **FITS file**.
The complete data analysis can be easily replicated by running QSFit (as shown in the example above) on all the spectra in the sample.

Contacts

Giorgio Calderone (calderone@oats.inaf.it)

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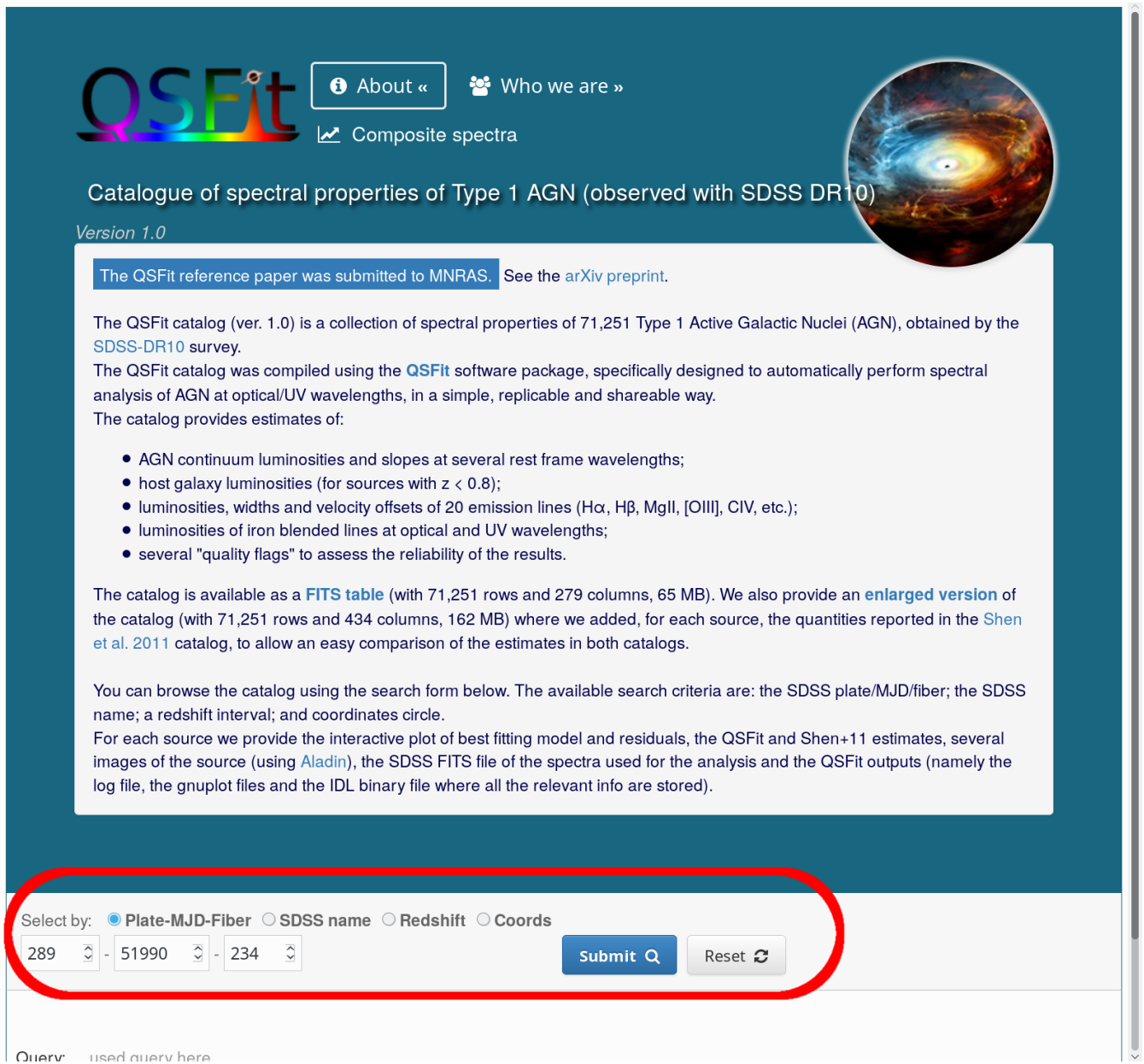

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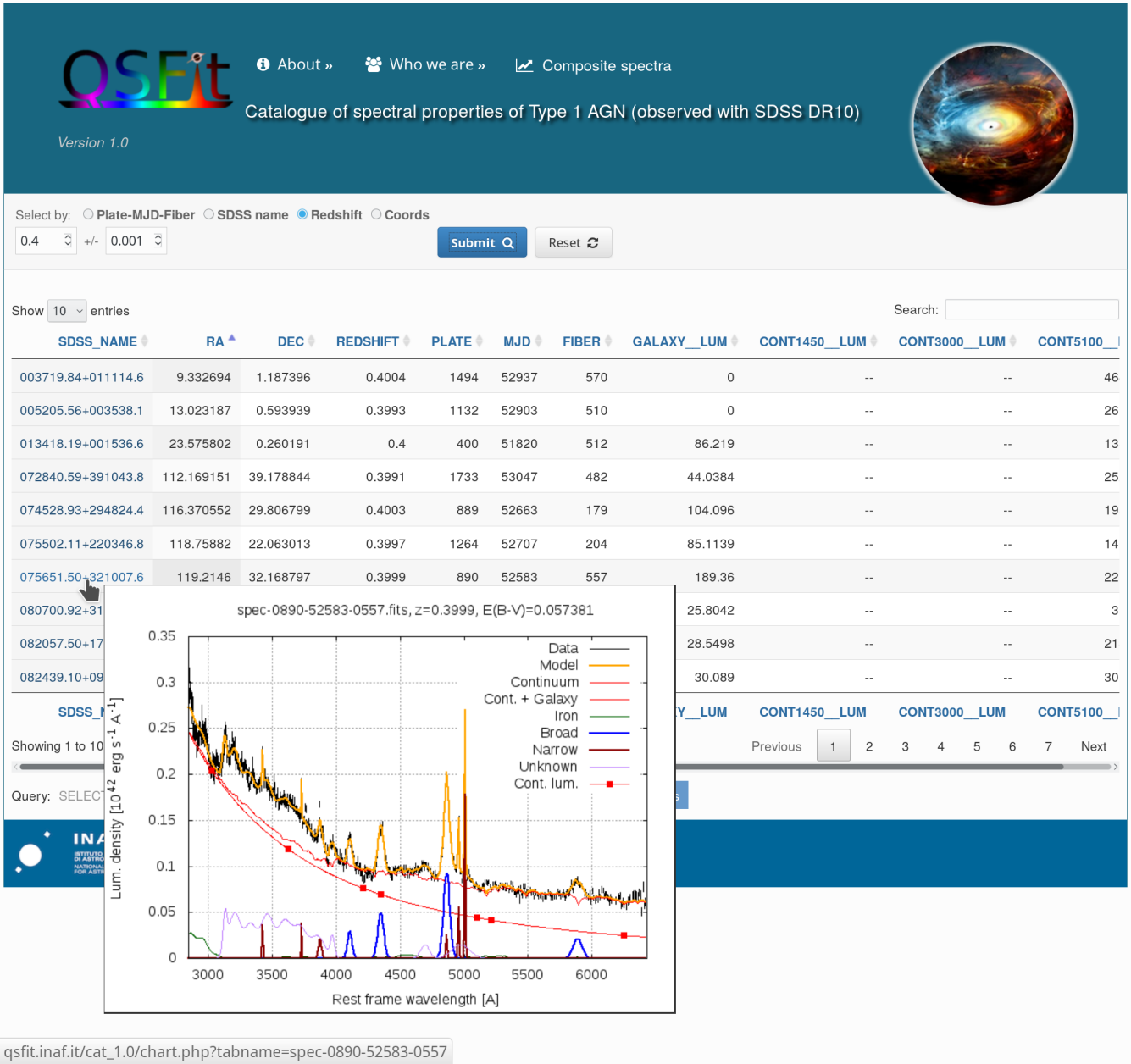

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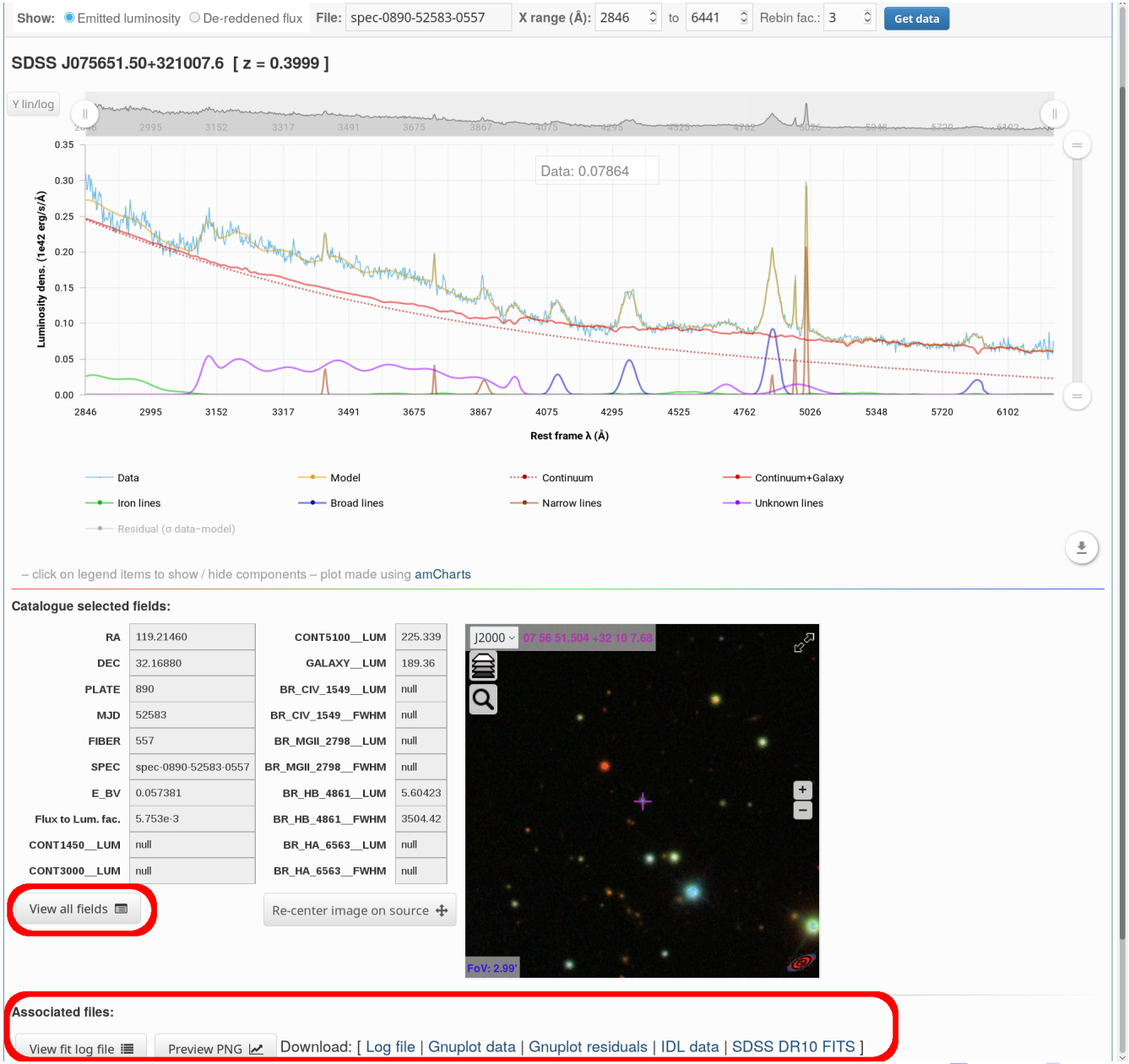

Conclusions

The catalog:

- 71250 sources from SDSS–DR7 Type 1 QSO catalog;
- display each source on the website;
- download the whole catalog as a FITS file;

Applications:

- black hole mass estimates through AD modeling;
- comparison of different galaxy templates;
- comparison of emission line models;
- analysis of new data;

References:

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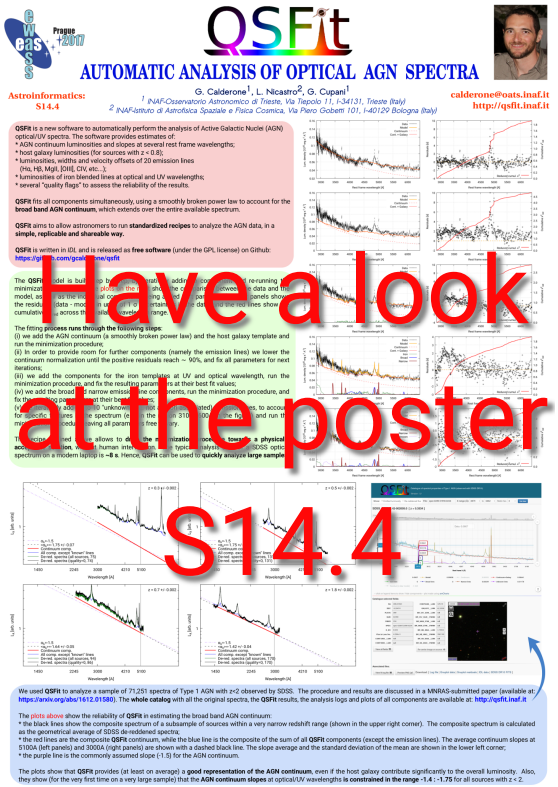

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