# Thoughts on PFS spectrum viewer and database access (inspired by the SDSS example)

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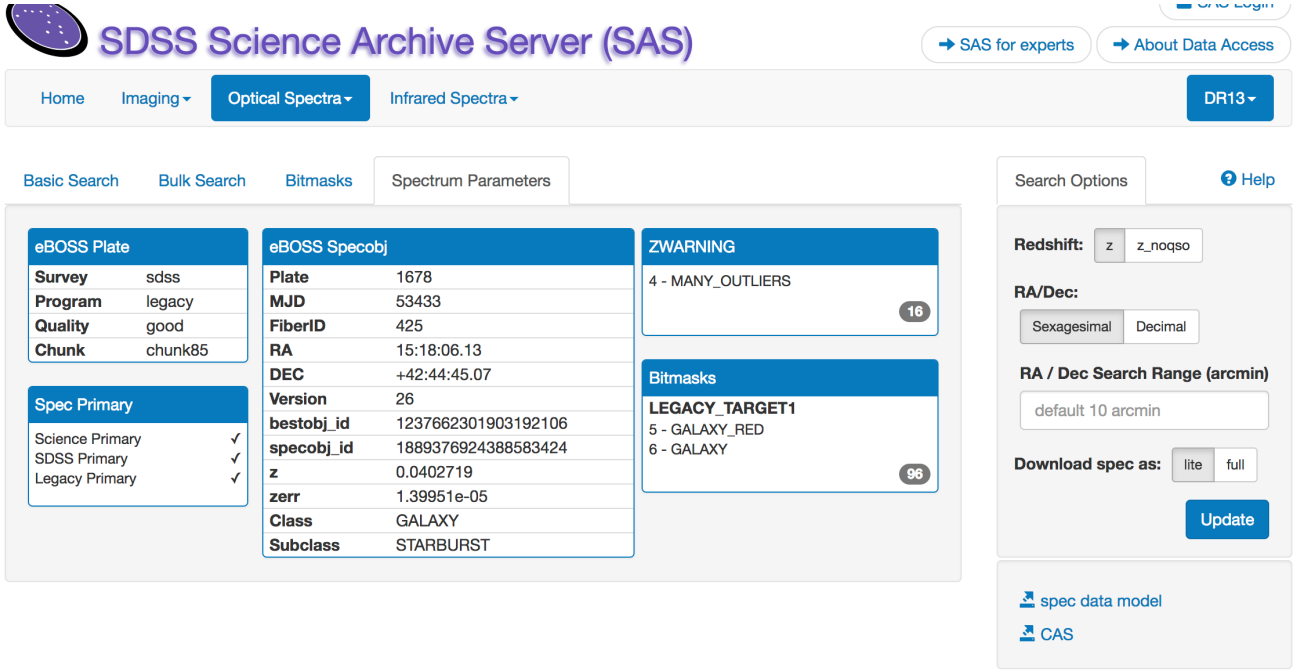
# SDSS vs. PFS spectra

- SDSS data are organized into plates. So a given observation is specified by a plate number, fiber number, and a date of observation. All objects on a given plate have the same exposure.
- For cosmology survey, PFS spectra will be roughly analogous. But galaxy evolution survey (and also galactic archeology) will have very different exposure times for different objects in a given pointing. The plate/fiber model will break down.
- PFS cosmology and galaxy evolution spectra will often be much lower S/N than SDSS.

# In SDSS, there are multiple ways to access the spectra

- Downloading data in bulk:
  - All spectra in a given plate.
  - All spectra from a list of objects that come from a DB query.
  - All spectra from a pre-defined list




*https://dr13.sdss.org/optical/spectrum/view*

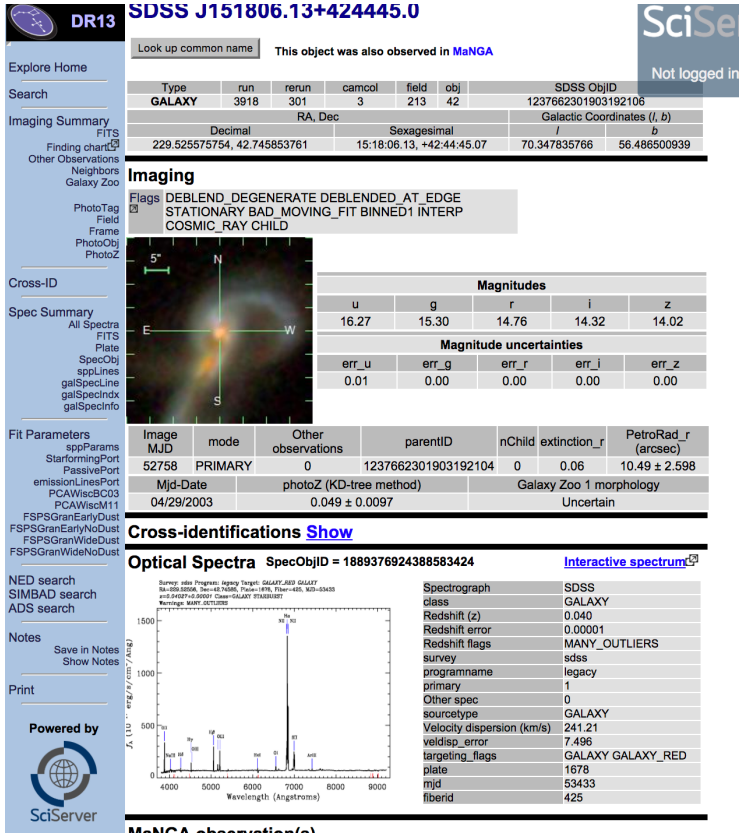
# Going from images to spectra

This “explore” page is one click from the SDSS equivalent of hscMap.

Note the links on the left-hand side that take you directly to the detailed parameters for each object:

- Photometric information
- Targeting information (why was a spectrum taken of this object?)
- Parameters measured from this spectrum (redshift, classification, line strengths, spectral quality, etc)
- Easy links to the bulk data (fits images, spectra of the full plate, etc.

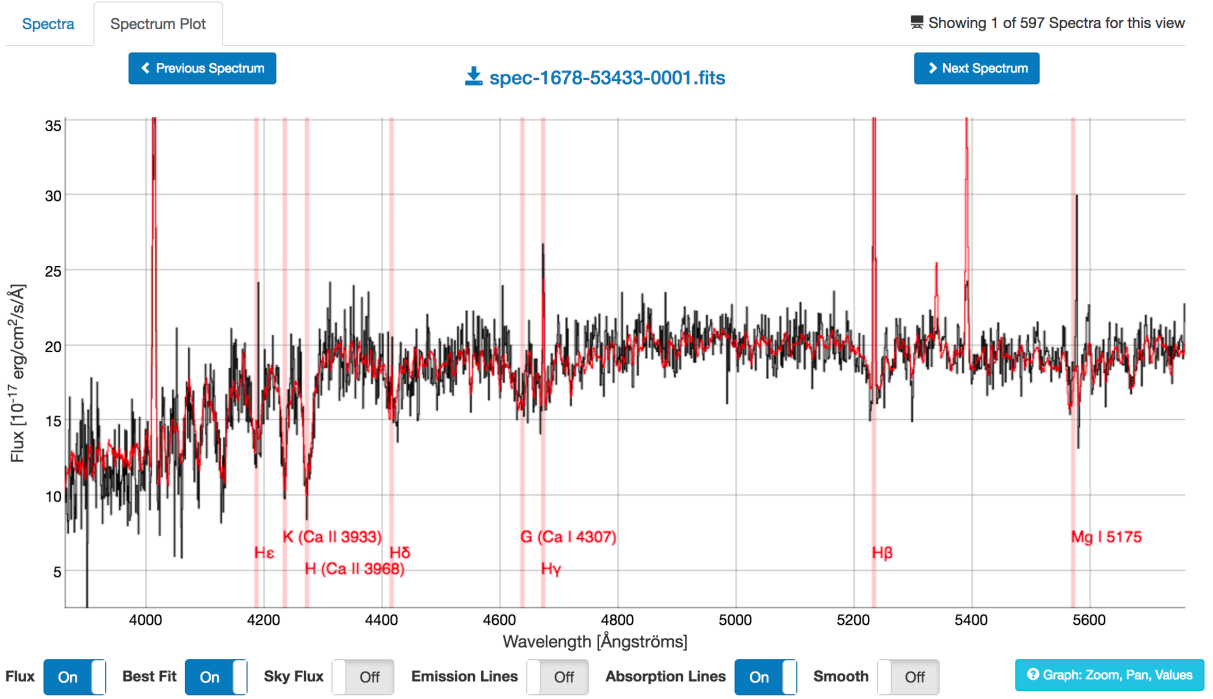
*http://cas.sdss.org/dr13/en/tools/explore/summary.aspx*



# Interacting with the spectra

We would like the ability to:

- Zoom into any part of the spectrum
- Change the smoothing
- Superpose best-fit model(s)
- Show difference (residuals) between spectrum and model
- Indicate position of emission & absorption lines
- Show estimated noise per pixel
- Show background sky
- Show mask bits
- Show spectral resolution



# PFS-specific thoughts

- The provenance of our spectra may be complicated, with multiple exposures over multiple times. We need to make this history apparent to the user. We may want the ability to look at subsets of the data taken at different times for a given object.
- PFS cosmology spectra will mostly be very low S/N, with 1-2 emission lines, and little continuum. How best to present the data in this context?
- PFS galaxy evolution spectra will often also be low S/N. We will want to smooth in various ways, to emphasize different features. Or to zoom into Ly alpha.
- PFS galactic archeology spectra will be higher S/N. They may want the ability to subtract continuum, superpose atmosphere models. Not needed within hscMap?
- Scientists will want to stack spectra. But this may be best done outside database/hscMap.