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1 Continuum Fitting Addendum

In order to fit the continuum, we should fit a straight line through the fitting windows **in log-log space**. This is equivalent to fitting a power law in linear space.

If we start with a power law in linear space:

$$y = Ax^m,$$

then

$$\log y = m \log x + \log A,$$

so

$$\log y = m \log x + B,$$

which is a straight line in log-log space.

It turns out the iron template fitting is easier in linear space, so we'll need to use something other than numpy.polyfit to do the power-law fitting. The best alternative is probably scipy.optimize.curve_fit.

2 Continuum + Iron Fitting

Instead of doing just continuum subtraction, we will fit the underlying continuum and iron emission at the same time, then subtract both from the spectrum.

Before fitting:

- Interpolate the iron template.
- Code a basic function for a Gaussian function, $g(x, \mu, \sigma)$, where μ will be the center of the iron emission, and σ will be the σ_{conv} from the paper.

- Code a 3-parameter function that returns the convolution of the Gaussian broadening function and the log-spaced template, $f(\lambda) \star g(\lambda, \mu, \sigma)$

Now the fitting (CIV for example):

- "Rebin" your data into log-spacing.
- Gather the flux values in the regions blue-ward [1435 - 1465Å] and red-ward [1690 - 1710Å] of the CIV line.
- Fit a line of the following form:

$$F_{cont+iron}(A, k, B, \mu, \sigma) = A\lambda^k + BF_{iron}(\lambda, \mu, \sigma)$$

- Subtract this new fit from the spectrum.