in column density corresponds to a smaller change in residual intensity (column density $\propto$ optical depth $\propto$ –ln[residual intensity]). Conversely, if the BAL troughs are too weak, it is difficult to measure the strength of the trough, and weak BALs can disappear completely leaving only limits on the changes. Ideally, we want as many "moderate" depth troughs as possible. In practice, we usually only get one BAL of moderate depth. Fortunately, often it is the case that the wings of the C IV BAL show low optical depth as well as the center of the Si IV BAL.

Although these biases effect the general statistics, they do help us increase our probability of detecting BAL variations.

9.5 : Spectroscopic Setups

Setting consistent and accurate continua is very important in studying the BALs. Some BALs are so extensive that most of the wavelength regions which we might normally use as continuum are covered by absorption lines. For this reason, it is important to get wide wavelength coverage on either side of the BALs and BELs. Accurate fluxing is also important to maintain consistent spectral shapes between observing runs. We also need sufficiently high resolution to split the C IV doublet, which has a splitting of roughly 8Å at $z_e \sim 2$. This will help us discern a set of blended narrow lines from a "resolved" broad line, as well as help resolve structure in the BALs.

For the Lick spectrograph system, we normally have to choose between wavelength coverage and resolution. To accomplish the goals listed above, we have usually taken low resolution, wide spectral range observations, as well as higher resolution spectra centered on the BALs of interest. The slit was aligned approximately in the direction of differential atmospheric refraction to avoid light loss in the UV. In addition, large slit ($\sim$7 arcseconds) spectra were also taken to insure accurate fluxing.