

3–4. The ionizing flux has increased. The ionization parameter is larger at higher outflow velocities. To justify this, look at the changes in absorption of C IV and N V at outflow velocities of  $0.09c$ ,  $0.12c$ , and  $0.17c$ . Note that this result is very marginal given the S/N and confusion in the Ly $\alpha$  forest (see §1.2).

For BAL time variability due to changes in an ionizing continuum source, all the line-of-sight gas must be affected in some manner, although the changes may or may not be visible. The low velocity, strong C IV BAL did not show variability. This may be due higher optical depths at these velocities (see figure 3–6) and/or a value of  $U$  near  $U_p(\text{C}^{+3})$ . We leave it to the reader to decide if this is consistent with the changes or lack of changes in other ions at the same velocity.

### 13.3 : 0842+3431 (CSO 203)

This BALQSO showed three distinct absorption line strengths within about a one year timespan (Barlow, Junkkarinen, Burbidge, Weymann, Morris, and Korista 1992, hereafter BJBWMK). The changes in terms of fractional change in column densities were similar between each epoch. In BJBWMK, a lower limit on the line-of-sight distance through the BALR was estimated based on the velocity width of the trough and the lack of velocity variations, (*i.e.* the BALR maintains its velocity structure). These facts implied that the mechanism for the BAL variations must propagate along our line-of-sight at nearly the speed of light (consistent with photoionization by the continuum source). During the period during the large changes (see figure 12-3) in CSO 203, the observed continuum showed little or no variation ( $<0.1$  magnitudes). Delays from a previous continuum change due to finite recombination timescales were tentatively ruled out from the pattern of changes (see §3.6.3 and BJBWMK).

After the large BAL changes occurred, we continued to monitor the object closely. See page 3 of figure 13–1 and the second 0842+3431 graph in figure 12–3. We observed a significant continuum level decrease ( $\sim 0.16$  magnitudes) *after* the large BAL changes. However, at the end of the spectral monitoring for this thesis project, we saw an increase