

For this object, the data in figure 13–1 also show that the spectral slope tends to follow the continuum level. This was shown to be true for Seyfert galaxies by Edelson *et al.* (1990), and is apparently also true for at least some moderate redshift QSOs.

13.2 : 0146+0142 (UM 141)

Referring to figure 12–3, we notice BAL changes at a few different wavelengths. This QSO shows a CIV BAL with higher than average outflow velocity ($\sim 0.12c$) which has reduced or eliminated the Si IV/O IV] emission line. (This BAL must be due to CIV, since if it were Si IV it shows no corresponding CIV BAL.) BAL time variability is evident at this velocity.

We also see changes at about 1300\AA . Here, we will attempt to argue that this absorption is also due to CIV, at a velocity of $\sim 0.17c$. Firstly, if this absorption were Si IV, it tends to show too little CIV absorption at the same velocity. Note that BAL time variability gives us a minimum strength of absorption, even though we cannot accurately determine the continuum. Note also that there is an O I $\lambda 1302$ BEL near this position, but since the REWs of the other BELs did not appear to change, there is no reason to think that the O I BEL changed. Secondly, there is no change in CIV at the same velocity, although this can be reconciled by have U near the $U_p(\text{C}^{+3})$.

Thirdly, there is a trough at about 1060\AA which could be due to P V or Fe III. There appears to be marginal BAL decreases in this trough. The decrease in CIV absorption means that either U is larger than $U_p(\text{C}^{+3})$, in which case U is too high to see Fe III (see figure 3–4), or U is decreasing and is smaller than $U_p(\text{C}^{+3})$, in which case we must see an *increase* in Fe III. The other possibility, that the P V BAL is decreasing also seems unlikely, since changes in P^{+4} also seem unlikely since this would imply $U > U_p(\text{C}^{+3})$ (see figure 3–4), which revokes the reconciliation in the second argument above.

A reasonable solution is that the absorption at 1060\AA is NV at $v \simeq 0.17c$ and corresponds to the CIV BAL at $\lambda \simeq 1300\text{\AA}$. In the interest of brevity, we put forth the following scenario, and allow the reader to agree or disagree based on figure 12–3 and