

**Figure 3-5**

In this figure, we show the expected fractional change in fractional abundance (fa) for an increase in the ionization parameter between two epochs, 1 and 2,  $\Delta\log(U) = \log(U_2) - \log(U_1)$ , plotted as a function of  $\log(U_1)$ . Note that  $\Delta\log(U) \sim \Delta\log(L_\nu) = \Delta\text{magnitude}/2.5$  (see text for details). The top graph shows  $\text{C}^{+3}$  for three different luminosity changes. The curves for  $\Delta\log(U)=0.2, 0.08$ , and  $0.04$  correspond to magnitude changes of 0.5, 0.2, and 0.1.

The lower graph shows the changes for various relevant ions for a magnitude change of 0.2. The point at which each curve crosses zero corresponds to  $U_p$  for each ion. Note that the level of change always increases for values of  $U$  further from  $U_p$ .