where ν_o is the frequency of a one Rydberg photon (13.598 eV, 911.8Å, 3.288×10^{15} Hz), r is the distance from the ionizing source, and $L(\nu)$ is the luminosity of the ionizing source (energy per unit time per unit frequency interval). Note that for a power law continuum, $L(\nu) \propto \nu^{\alpha}$, we have: $U = L(\nu_o)/(h|\alpha|c4\pi r^2 n_e)$, for $\alpha<0$. The ionization parameter is useful in constant density, plane parallel models since similar ionization levels and line strengths will occur in systems with different electron densities and incident photon fluxes, but similar U. The value of U derived via line ratios can be used to derive the temperature and ionization structure of the gas (*cf.* Davidson 1977).

For time variability on year timescales, we assume that r remains constant (in one year, at ~20,000 km s^{-1}, the clouds move only 0.02 pc which is probably much less than the distance to the central source). For the high ionization levels in the BALR, hydrogen is probably nearly completely ionized, with a neutral fraction of less than 10^{-4}. Since most of the gas is hydrogen (neutral or ionized), $n_e \sim n_{\rm p} \sim n_{\rm H}$, where $n_{\rm p}$ is the proton density and $n_{\rm H}$ is the total hydrogen density. Since any small change in the ionization level will result in a negligible change in n_e, we assume that n_e remains constant. Therefore, the only time variable parameter in U is the luminosity, $L(\nu)$, of the ionizing source. (One possible exception to this might be if there are dynamical changes in the volume density of the clouds, which would change n_e.)

3.2 : Radiative Equilibrium Calculations

For optically-selected QSOs, $\alpha \sim -0.8$ (Francis *et al.* 1992), assuming $L_\nu \propto \nu^{\alpha}$. However, we will adopt a more realistic AGN continuum derived in Mathews and Ferland (1987), and which is specified within the radiative-collisional equilibrium program called "CLOUDY" (*cf.* Ferland and Truran 1981). This idealized continuum is shown in figure 3-1, as relative flux (energy per unit frequency) versus frequency, both expressed as base 10 logarithms. This continuum includes the "big blue bump" possibly connected with $\sim10^5$ °K thermal emission from an accretion disk, a hard X-Ray power law, and dust