

AST 300B – Spring 2019

In-class/take-home Problem Due: Monday Feb. 4

11. Optical forbidden line ratios in HII regions may be used to derive the temperature and density. The graph below shows how the OIII (doubly ionized oxygen) line ratio of 4364/5008 (Angstroms) depends on T. This line ratio is measured in a spectrum toward an HII region to be $I(4364)/I(5008) = 0.003$. The reddening due to dust between these two wavelengths is measured to be $A(4363) - A(5008) = 0.76$ mag. Estimate the temperature of this HII region if $n_e \sim 10^3 \text{ cm}^{-3}$.

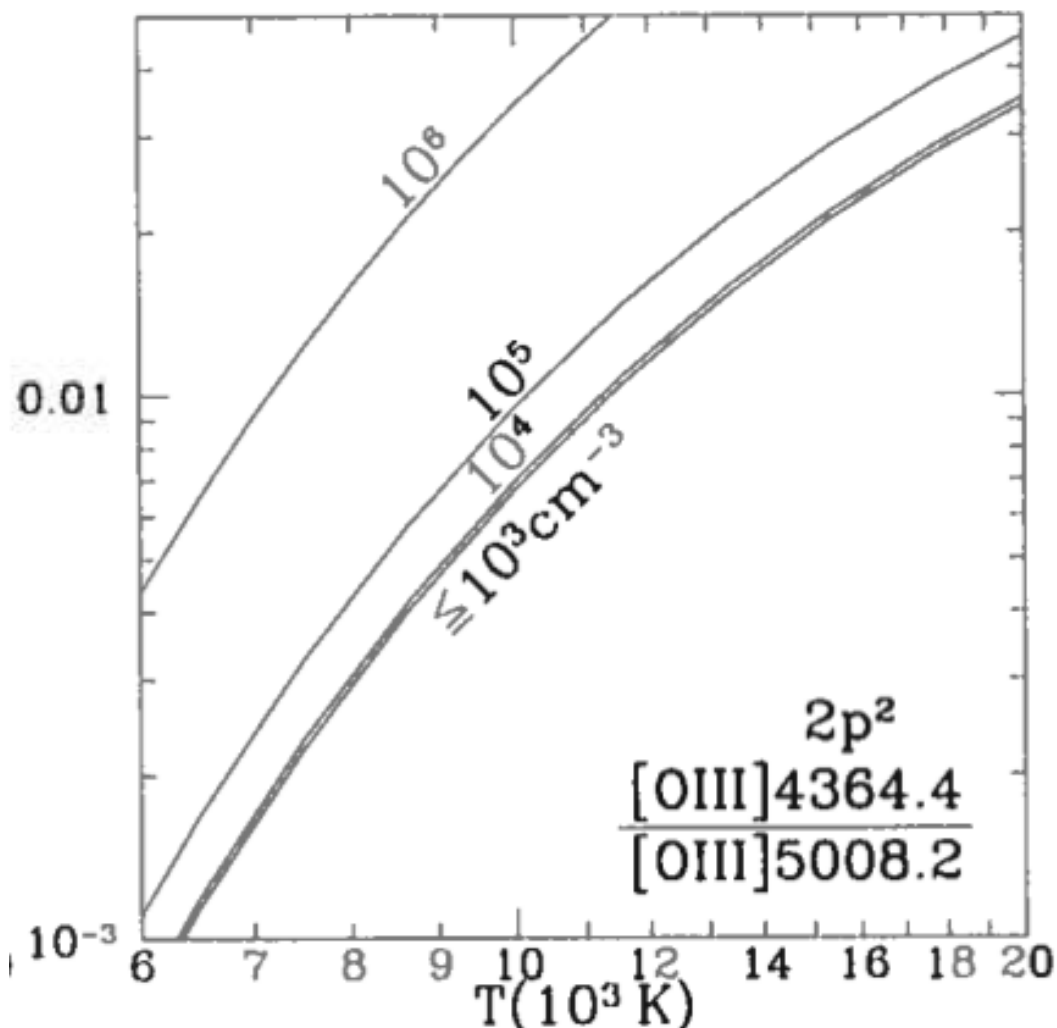


FIGURE 1: Plot of the intensity ratio of $\lambda = 4364/5008$ for OIII vs. electron thermal temperature in HII regions. The different curves correspond to different electron number densities (cm^{-3}).