ASSIGNMENT -2
submission date : 27 April 2020

Using cloudy,

(1) Plot ion fraction for (HI, HII, HeI, HeII, HeIII) as a function of depth (or radius) for the default model (i.e for the model given in the input file). You can use the file using depth command.

(2) Plot the size of the HII region as a function of stellar temperature, gas density and metallicity (vary one of them each time keeping the other two fixed) and compare with the static HII radius we derived in the class. Remember, to get L for a given surface temperature of the star you need to assume the size. Use main sequence relationship (you may use Eker et al., 2015, AJ, 149, 131 or some other reference). To derive analytic express for the HII region radius you have to calculate N_* for each case.

(3) Plot the ratio of the size HII/HeII region as a function of stellar temperature?

(4) Plot the relationship between HII region temperature and star temperature, density and metallicity of the ISM (again while varying one parameter keep the other two fixed)? As there will be a slight dependence of T on depth you can use the mean temperature along the radius of the HII region.

(5) Plot different emission line ratios (e.g [OIII/OII], NII/Hα, [Lyα/Hα], [Hα/H**β**], etc) as a function of star temperature, density and metallicity of the ISM? You will use output from *.lin file.

As in the previous assignment I would like you to write a proper report discussing the results you find.