ASTRO 402. Assignment # 1

Feb 22 2005. Due Mar 21, 2005

This assignment gives you some data and asks you to use them to calculate the gas-to-dust ratio by mass in the interstellar medium.

The data are in

/u/gk/A402

and are called

lyalpha.dat

with descriptive notes: lyalpha.notes.

The data are from A. Diplas and B. Savage, 1994, ApJS 93, 211.

Note the columns in the data for N(HI), error on N(HI), and E(B-V). Note also the column for stellar Lyman alpha absorption, i.e. that produced in the stellar atmosphere.

You will need a value for Q_λ (just take the value at V, 5500 Å). See Draine and Lee (1984) (reference in Feb 22 notes) and Bruce's "dust" web site. Also, to make it easy, the values are in file "qfin.dat" in the same directory. Columns: line number, wavelength in microns, Q (silicates), Q (carbonaceous). Assume that the interstellar dust is 50% silicate grains by number, 50% carbonaceous grains by number. Assume the grain radius is 2000 Å (the values of Q are appropriate for this grain size). Material density of silicates 3.5 gm cm^{-3}, carbonaceous grains 2.25 gm cm^{-3}.