ASTRO 517 HW

A neutron star is observed by ROSAT PSPC dedector. the column density between NS and us is known to be $2.0 \times e^{18}$ atoms cm^{-2}. The surface temperature of the cooling NS is 300 000 ^{o}K.

i- Calculate the expected count rate in ROSAT pass band with the BORON filter.

ii- If the background count rate is 0.001 counts/sec what is the necessary observing time to get 5 sigma confidance level?

Use Interstellar Absorption (Morrison and McCammon) model to calculate NH values which is in the subroutine **absnh.f**. The routines: **datain.f, drm.f** can be used to read input data.

To simulate PSPC dedector responce matrix use the data files: **drm1.dta, drm2.dta, drm3.dta**. The effective area data file is: **effar.dta**. **drmch.dta** is the file for channel energies and **boron.dta** is the transmission of the BORON filter wrt energy.

Detector responce matrix is given for 729 energy channels:

drm1 => first 256 channesl

drm2 => next 256 channels

drm3 => rest of the channels

Channel energies are in file **drmch.dta** and **effar.dta** is in tabular form with the fist row beeing the channel number, second row energy dependent effective area for normal incidance. Ignore other columns.