

## ISSIAAtomicData/phase2\_20161006/01\_chianti\_errors

Here we generate many realizations of emissivities computed with CHIANTI. Only the emissivities for lines of interest are saved. The primary file of interest is `fe_13.monte_carlo_normal_nsim=1000.h5`

- **RUN\_CALC\_EMISS\_MC:** This routine runs everything and takes no inputs
  - `calc_emiss_mc`: Loop over realizations, collect emissivities for selected lines, save to HDF.
  - `emiss_calc`: Modified version of standard CHIANTI routine, adds keyword for adding uncertainties (either normal or uniform)
  - `setup_ion`: Called by `emiss_calc`, perturbs A-values and collision rates. Some nuances
    - \* Looks for the file ‘`setup_ion.seed.txt`’ to get the initial seed, if this file doesn’t exist a seed is generated and saved to the file. This should allow for subsequent runs to generate the same sequence of random perturbations to the atomic data. We’re not saving all of the emissivity calculations, but we may want to go back and do this for a specific realization of interest.
    - \* The magnitude of the perturbation is set by ‘`ups_sigma.txt`’ and ‘`a-values_sigma.txt`’ where uncertainties have been assigned based on recent calculations. Note that the minimum uncertainty on the collision rates is 5% and not 2%, as in the previous version of the file.
- **PLOT\_EMISS\_MC:** plots the emissivities

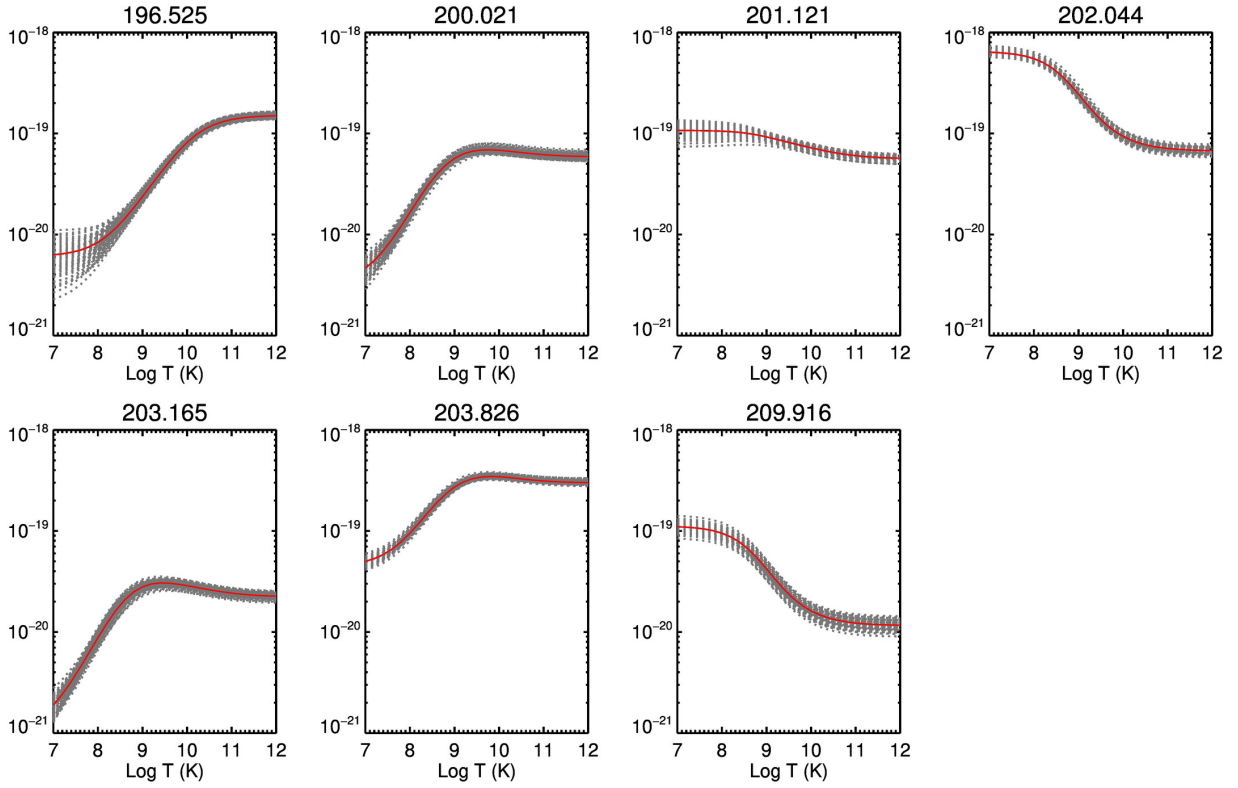


Figure 1: A sampling of the randomly perturbed emissivities for the lines of interest. The red line is the default CHIANTI calculation.

- **Output file**

The output file is saved using

```
nrl_save_hdf, ioneq_file=ioneq_file, $  
              logn=logn, logt_max=logt_max, nsim=nsim, $  
              emissivity=emissivity, transition=transition, wavelength=wavelength, $  
              time_stamp=time_stamp, $  
              file=out_file+'_nsim='+trim(nsim)+'.h5'
```