## Problem 3: Strömgren sphere

Aims of this exercise

1. Understand that photochemistry is a mess
2. Realize that KROME saves your day

- Homework: because 7 hours
of school wasn't enough
(Anonymous)

$$H + \gamma \rightarrow H^+ + e^- \tag{1}$$
$$H^+ + e^- \rightarrow H + \gamma \tag{2}$$

KROME Bootcamp 2014 - Part1: Optically thin case

Recap for part1
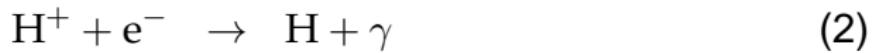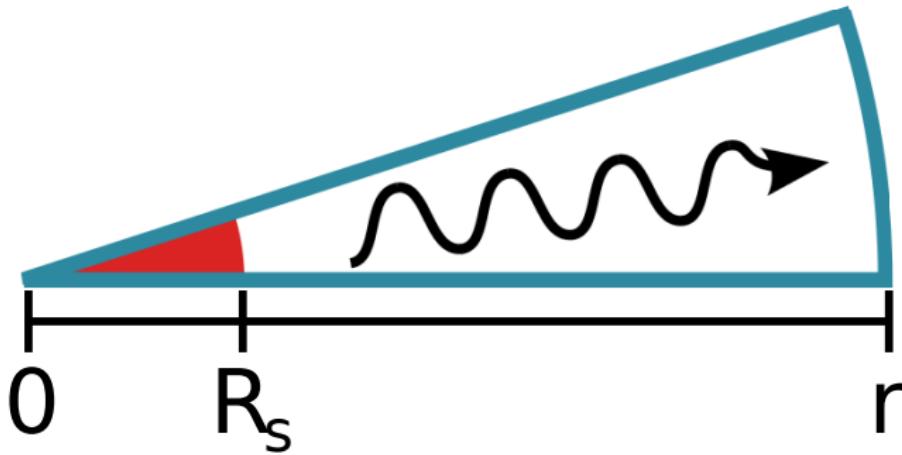
- http://kromepackage.org/bootcamp/exercises/day2.tar.gz
- NOTE: sketch for test.f90 is provided
- TODO: complete the code using the pseudocode on the text

```
dt = 0.1 yr
LOOP time
 dt = dt * 1.01
 t = t + dt
 LOOP grid for i
  x(:) = xall(i,:)
  call KROME(x(:),Tgas,dt)
  xall(i,:) = x(:)
 END LOOP grid
 if(t>tmax) break loop on time
END LOOP time
```

Add photons source

- `krome_set_photoBin_BBlog(...)`
- `krome_photoBin_scale(...)`

```
dt = 0.1 yr
LOOP time
 dt = dt * 1.01
 t = t + dt
 LOOP grid for i
  <<<<<<-----INIT BB RADIATION
  <<<<<<-----SCALE BB RADIATION
  x(:) = xall(i,:)
  call KROME(x(:),Tgas,dt)
  xall(i,:) = x(:)
 END LOOP grid
 if(t>tmax) break loop on time
END LOOP time
```

Good to know

- Rescaling based on photon "history"
- Rescale using `krome_photoBin_scale_array(...)` subroutine
- Store opacity array at each grid point op(:)$\rightarrow$ opt(i,:)
- `krome_get_opacity_size` returns $\tau_i = \sum_j \Delta r_i\, n_{ij}^p\, \sigma_j$ at different energies ($h\nu$)
- Mimic photon "history" scaling radiation by $\prod_i \exp(-\tau_i)$ (and the geometrical factor)

GOOD WORK!
http://kromepackage.org/bootcamp/exercises/day2.tar.gz