# 1 Questions for professor Sundqvist

- What are the equations governing the processes in `pcyg.f90`

- What does this mean? `xnew=xstart+(v-sign(0.06,xmueou))*xmueou-v*xmuein`

- Pcygni profiles: Why don't we just take the absorption and the emission and add them together.

2 Questions for professor Samaey

- In [**Dimarco2018**], Equation (31) why does it correspond to diffusion (more specifically the second term on the right hand side).

- what is the difference between Monte Carlo and equation-free computing?

3 Solved questions

- Sundqvist+ 2009: what is thermal velocity (see Wikipedia)

- Sundqvist+ 2009: what is line force (see explanation Dylan)

- unclassified: what is a flux limiter? (see course notes)

- unclassified: what is cross section of scattering (see Wikipedia)

- Puls manual: p.26: how does the Milne equation appear? (see library book)

- pcyg.f90: what are p-rays? (see anwser professor Sundqvist)

  - parallel rays leaving the atmosphere (of, e.g. a star)
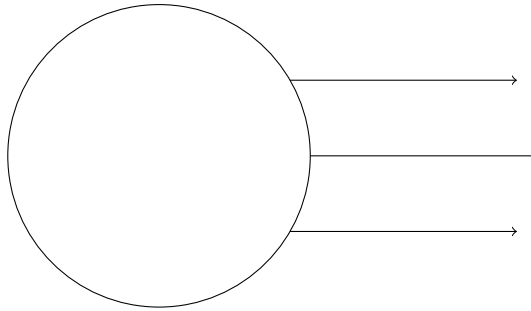
- pcyg.f90: what is meant by Eddington limb-darkening? (see answer professor Sundqvist)

  - standard limb darkening

- Sundqvist+ 2009: what is the geometry of a *slice*?

- CMFAA course notes p.13 (the example) what is understood by plane-parallel geometry and is it 1D or 2D? (see answer professor Sundqvist)

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- CMFAA course notes p.15: why is this called diffusion $F = T^3 \dfrac{dT}{dx}$ (flux proportional to local gradient in temperature)?

- unclassified: what is the terminal velocity v_∞?

- unclassified: what is Sobo-distribution? (Sobolev distribution)

- pcyg.f90: for `test_number = 2`, why do we call it isotropic since isotropy of `mu` does not imply isotropy of `theta`? (myself, see definition of intensity)

- (for which star are the exerpimental data and what assumptions are used in the theory?) (see ... and derive some formulas)

- book *Stellar Atmospheres* [Mihalas] (bought)

- ordening of array `freq` (adapted the code, experimented with it)

  - why `freq(1) = xmax-5*deltax`?
  - frequency binning: how are you sure that no lower/higher frequencies can occur?
    derive this analytically

- `Pcyg.f90` does it take into account that photons are scattered away from the observer? (via assumption of radial symmetry)

4 Interesting problems

- inverse radiative transfer problem

might be interesting for looking at

- splitting methods
- Eddington factors

5 Do not forget

- convergence plots