Pre-class assignment #28

Brian O'Shea,
PHY-905-003, Computational Astrophysics and Astrostatistics
Spring 2017

This assignment is due the evening of Tuesday April 25, 2017. Turn in all materials via GitHub.

Reading:

1. Chapters 4, 5, and 11 of Radiation Hydrodynamics by John Castor (available at that link and in the included PDF). Chapter 4 covers radiation basics (which you may already know if you have taken an interstellar processes class); Chapter 5 covers steady-state radiative transfer; and Chapter 11 surveys some of the numerical techniques used in radiation transport. You will be randomly selected to implement either a flux-limited diffusion or Monte Carlo radiation transport method; pay particular attention to those.

Your assignment: Answer the questions below in the file `ANSWERS.md`:

1. How does making the steady-state simplify the calculation of radiation transport?
2. What are the "moments" of the transport equations, and why do we care about that?
3. What are the relative advantages and disadvantages of the flux-limited diffusion and the Monte Carlo approaches to radiation transport?
4. Why is it that scattering of radiation is such a challenge in numerical radiation transport?
5. What are any other questions that you have about the material you read, any points that are not clear, or anything you'd like to know more about. Aim for at least 3 questions/unclear points/etc.

Handing it in: Include your answers to the questions (in the file `ANSWERS.md`) in your assignment.