Problem Set 5: due midnight 6 Dec

Related reading

R&L Sections 7.5-7.7, 8.1-8.3

Problem 1 – Finish the Inverse Compton Tutorial Jupyter notebook: Final project prep!

Finish working your way through the rest of the Tutorial (sections 4 and 5). The raw code is appended at the end. Make sure you can do all steps and understand how to make changes because you will want to use this as your starting point for your final project. Pay extra attention to 5.1 to explore a thermal electron distribution upscattering a disk blackbody (approximated as a 1 keV monoenergetic distribution). *Verify* that you have it right by calculating what the slope should be using a direct calculation of the Compton Y parameter based on your setup.

Problem 2 – MC approach to SSC: Final project prep!

Write a new code, using relevant parts of the MC tutorial, to calculate the SSC spectrum from the first slice of your jet model. Specifically, take the output synchrotron spectrum (be careful to use the local photons not the flux detected at earth) and convert to a local $\nu(\epsilon)d\epsilon$ to sample from, along with sampling from your electron distribution. Make sure to understand how to normalise your MC output spectrum to 'real' units (will be covered in the WC). Use Ghisellini Ch6 to check your normalisation.

Problem 3 – Final Project source choice due Tuesday 5 December!

By Thursday 28 Nov I will be posting a list of possible project choices (or as described in class, you can choose your own, in consultation with me, but it must have good enough data to "fit" with self-absorbed synchrotron and inverse Compton).

Use the google form below to provide a list of 3 project choices, in order of preference. First come first served!

Google form link: `https://forms.gle/YjuFc3aMgQt5NvVC7`