**Project Thoughts and Ideas**

Mike Ireland, 31 Aug

Here is a general idea of where to go in this project:

1. Read my old lecture notes, and create (or modify) a function that finds the electron pressure as a function of number density, for a zero-temperature (fully degenerate) electron gas.
2. Use this to compute the internal structure of a white dwarf with zero internal temperature and a range of masses up to the Chandrasekhar mass.
3. Return to Equation (15), and re-derive pressure as a function of number density (as an integral, evaluated numerically).
4. Read about how to add electron-positron production into this. I think this is in Cox and Guili, and involves both relativistic energy and correct interpretation of the chemical potential. Mark Krumholz might recall some of this stuff too. I think that actually \*nothing\* changes for electrons, but positrons are just added in with a chemical potential ~1 MeV higher than the electrons. For a given number of baryons, there are therefore more electrons than there would be without the positrons.
5. Create a radiative model of a very hot main sequence star – does electron/positron production ever matter?

Getting to the end isn’t essential, but learning in the process!