

Astronomy 45
Introduction to Astrophysics

Problem Set 8 - Due Monday April 21

1. How many kilowatt hours are generated in a fusion reactor that converts 1 kg of hydrogen to helium?

2. Show that for a star of mass M and constant mass density ρ , the central pressure is given by $P_c = 3GM^2/8\pi R^4$. What is the central temperature in terms of M and R ?

3. Consider two non-relativistic white dwarfs *with the same central density*, one of which is made of carbon with $\mu_e = 2.00$ and the other of iron with $\mu_e = 2.15$. Which star has the smaller radius and which the smaller mass? Also calculate the ratio of the Chandrasekhar masses of the two stars.