

Homework 12

Problem 1 (5 points)

Derive the exact formula for degeneracy pressure due to relativistic ($v = c$) fermions similar to eq. 16.15, though, express final answer via mass of fermion particle m_f and its density n_f . Assume temperature of the gas to be zero.

Problem 2 bonus (5 points)

The section 15.3 of the text book describes observations of SN 1987A neutrinos arrival. Neutrinos arrive to Earth 3 hours before photons hit the Earth. How would you explain that light, which is supposedly the fastest, was beaten by neutrinos?

Problem 3 (5 points)

A neutron star with $R = 10$ km and mass $M = 2M_\odot$ has observed luminosity of L_\odot . Assuming that we are far away from this star, find its luminosity at the surface of the star.

Problem 4 (5 points)

Solve problem 17.4