Physics 301: Problems #1
August 21, 2020

1. Show that for and an adiabatic ($Q = 0$) compression of an ideal gas, $VT^{f/2} =$ constant.

2. In problem 7.45 you will show that the radiation pressure of a photon gas is (1/3) the energy density. We can calculate this for a photon gas of a single frequency f as follows (from Baierlein, problem 1.2). Analogous to our calculation of the pressure due to an ideal monatomic gas, consider a volume V with N photons of energy $E = hf$ and momentum $p = hf/c$.