

Physics 301

Homework due 11 September 2024

1) Find an expression for the density of states of a relativistic, massless, classical particle confined to the range $0 < r < r_0$ and $0 < p < p_0$.

2) Stowe problem 3-8.

3) Consider a system of 100 air molecules in an otherwise empty room. Calculate the probability that 49 are in the front 60% of the room and 55 are in the top half.

4) Give an example of a process that involves continuous change but is

(a) quasi-static

(b) not quasi-static

Support both answers numerically. Choose examples that are different from those in the Stowe book.

5) How would the H-Theorem be changed for a system in which the transition rate W_{rs} between states r and s were not equal to the rate for the reverse process?