

J08T.2 - Spin Gas

Problem

Consider a gas of N non-interacting, spin-1/2 fermions, each of mass m . Let the gas initially be in a container of volume V at temperature $T = 0$.

- a) Calculate the total energy of the gas.
- b) Let the gas expand irreversibly into a volume V' . Show that for V' the behavior of the gas becomes classical. What is the final temperature of the gas in this limit?
- c) What was the change in entropy of the gas during its expansion?