

[tex101] FD gas in \mathcal{D} dimensions: heat capacity at low temperature

Use the results of [tex118] and [tex100] to determine the low-temperature asymptotic behavior,

$$\frac{C_V}{\mathcal{N}k_B} \sim \mathcal{D} \frac{\pi^2}{6} \frac{T}{T_F},$$

of the heat capacity of the ideal Fermi-Dirac gas in \mathcal{D} dimensions.

Solution: