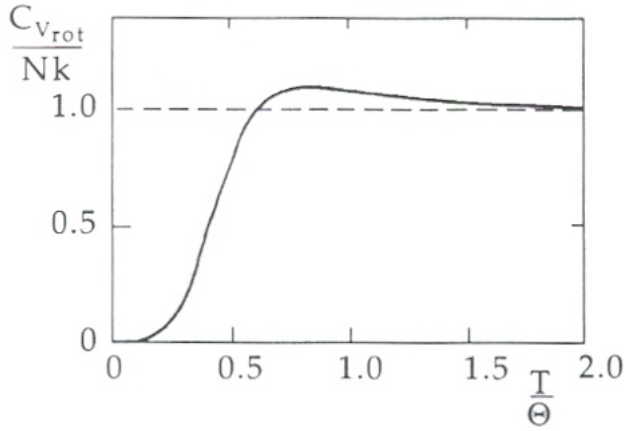
Rotational and vibrational heat capacities [tsl32]

Rotational heat capacity of two-atomic gas:

$$T \ll \Theta: \qquad C \simeq 12 N k_B \left(\frac{\Theta}{T}\right)^2 e^{-2\Theta/T}; \quad \Theta \equiv \frac{\hbar^2}{2 I k_B}$$

$$T \gg \Theta: \qquad C \simeq N k_B \left[1 + \frac{1}{45}\left(\frac{\Theta}{T}\right)^2 + \ldots\right]$$

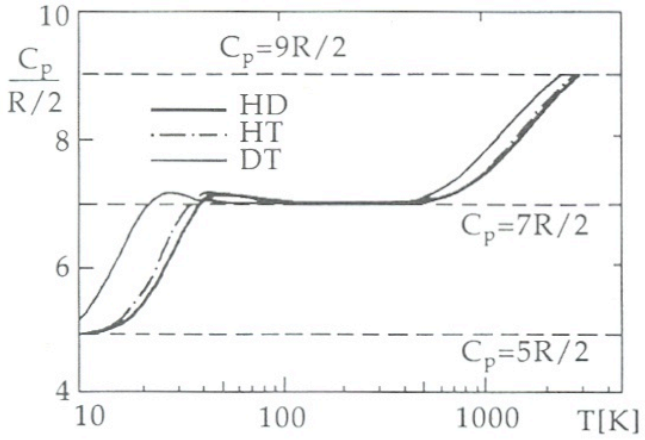


Rotational and vibrational heat capacities of hydrogen molecules:

H: ^{1}H (hydrogen)

D: ^{2}H (deuterium)

T: ^{3}H (tritium)



[from Greiner et al. 1995]