Clásica

$$Q_N(V,T) = \sum_{\{n_\epsilon\}}{}' \left[\left(\prod_\epsilon \tfrac{1}{n_\epsilon!} \prod_\epsilon \left(e^{-\beta\epsilon}\right)^{n_\epsilon} \right) \right] \times \frac{N!}{N!}$$

$$= \left(\tfrac{1}{N!}\right) \sum_{\{n_\epsilon\}}{}' \left[\left(\prod_\epsilon \tfrac{N!}{n_\epsilon!} \prod_\epsilon \left(e^{-\beta\epsilon}\right)^{n_\epsilon} \right) \right]$$

TEOREMA MULTINOMIALA

$$Q_N(V,T) = \tfrac{1}{N!} \left[\sum_\epsilon e^{-\beta\epsilon} \right]^N ,$$

$$= \tfrac{1}{N!} \left[Q_1(V,T) \right]^N$$

Gente espacio bastar

$$Q_1(V,T) \equiv \sum_\epsilon e^{-\beta\epsilon} \approx \tfrac{2\pi V}{h^3} (2m)^{3/2} \int_0^\infty e^{-\beta\epsilon} \epsilon^{1/2} d\epsilon$$

$$= \frac{V}{\lambda^3}$$

$$Q_N(V,T) = \frac{V^N}{N! \lambda^{3N}}$$

$\frac{V}{\lambda_T^3}$