$$\Sigma_N(E^{tot}) = \left(\frac{1}{2}\right)^{\frac{3N}{2}} \left\{ \frac{\pi^{\frac{3N}{2}}}{\left(\frac{3N}{2}\right)!} \left(E^{tot}\right)^{\frac{3N}{2}} \right\}$$

$$E^{tot} = \frac{8m}{h^2} V^{2/3} E$$

$$\Sigma_N(E) \simeq \left(\frac{V}{h^3}\right)^N \frac{(2\pi(mE)^{\frac{3N}{2}}}{\left(\frac{3N}{2}\right)!}$$

$$\frac{\partial \Sigma_N(E)}{\partial E} = \left(\frac{V}{h^3}\right)^N \frac{1}{\left(\frac{3N}{2}\right)!} (2\pi(m)^{\frac{3N}{2}} \left[\frac{3N}{2} - 1\right] e^{\frac{3N}{2}-1}$$

$$\underbrace{\left(\frac{3N}{2}\right)}_{\Sigma_N(E)} \cdot \frac{1}{E}$$

$$\simeq \frac{3N}{2} \Sigma_N(E) \cdot \frac{1}{E}$$

$$\Gamma_N(E;\Delta) \approx \frac{3N}{2} \Sigma_N(E) \cdot \frac{1}{E} \cdot \Delta$$

$$(\Delta \ll E) \quad \left(\frac{\Delta}{E}\right) \approx O\left(\frac{1}{\sqrt{N}}\right)$$

$$\Sigma_N(E) \approx \left(\frac{V}{h^3}\right)^N \frac{(2\pi(mE)^{\frac{3N}{2}}}{\left(\frac{3N}{2}\right)!}$$

$$\Gamma_N(E;\Delta) \approx \frac{3N}{2} \Sigma_N(E) \left(\frac{\Delta}{E}\right)$$

$$-h \left[\phi \right]$$