

$$\Psi(x,t) = \frac{1}{\sqrt{(2\pi\hbar(\hbar/a)\sqrt{\pi})}} \int_{-\infty}^{+\infty} e^{-\frac{(p-p_o)^2}{(\hbar/a)^2}} e^{-\frac{ip^2}{2m\hbar}} e^{\frac{ipx}{\hbar}} dp$$

la solution est la suivante :

$$\Psi(x,t) = \frac{1}{\sqrt{a\sqrt{\pi}} \sqrt{1+\tau}} \exp\left(-\frac{(x/a - k_o a \tau)^2}{2(1+i\tau)} + ik_o x - \frac{ik_o^2 a^2}{2} \tau - \frac{i}{2} \text{Arc tan } \tau\right)$$

$$\tau = \frac{\hbar t}{ma^2} \qquad k_o = \frac{p_o}{\hbar}$$