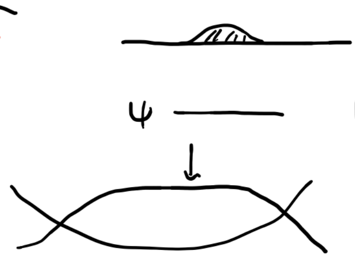
$$\mu \cancel{\psi} = \Big[\cancel{H_{kin}} + V(x) + \underbrace{g\, n(x)}_{g>0} \Big] \cancel{\psi}$$

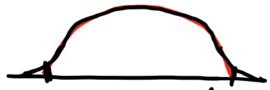


$$\frac{\partial^2 \psi}{\partial x^2}$$

$$\mu = \frac{1}{2}x^2 + g\,n(x)$$

$$n(x) = \frac{\mu}{g} - \frac{1}{2g}x^2 = \frac{\mu}{g}\left[1 - \frac{1}{2\mu}x^2\right]$$

$$R^2 = 2\mu \longrightarrow n(x) = n_0\left(1 - (x/R)^2\right) \longrightarrow$$

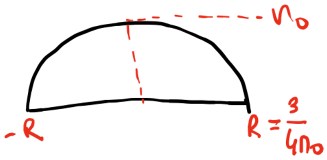


$$n_0 = \mu/g$$

$$1 = \int n(x)\,dx = \int_{-R}^{R} n_0\left(1 - \left(\frac{x}{R}\right)^2\right)dx = n_0 R \int_{-1}^{1} dx\,(1-x^2) = \frac{4}{3} n_0 R = 1$$

$$\left.\begin{aligned} n_0 &= \mu/g \\ R &= \sqrt{2\mu} \end{aligned}\right\} \quad \frac{4}{3}\sqrt{2}\,\frac{1}{g}\,\mu^{3/2} = 1 \longrightarrow \boxed{\mu = \left(\frac{3g}{4\sqrt{2}}\right)^{2/3}}$$

$$\boxed{n(x) = \frac{1}{g}\left(\frac{3g}{4\sqrt{2}}\right)^{2/3}\left[1 - \frac{x^2}{2\left(\frac{3g}{4\sqrt{2}}\right)^{2/3}}\right]}$$



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