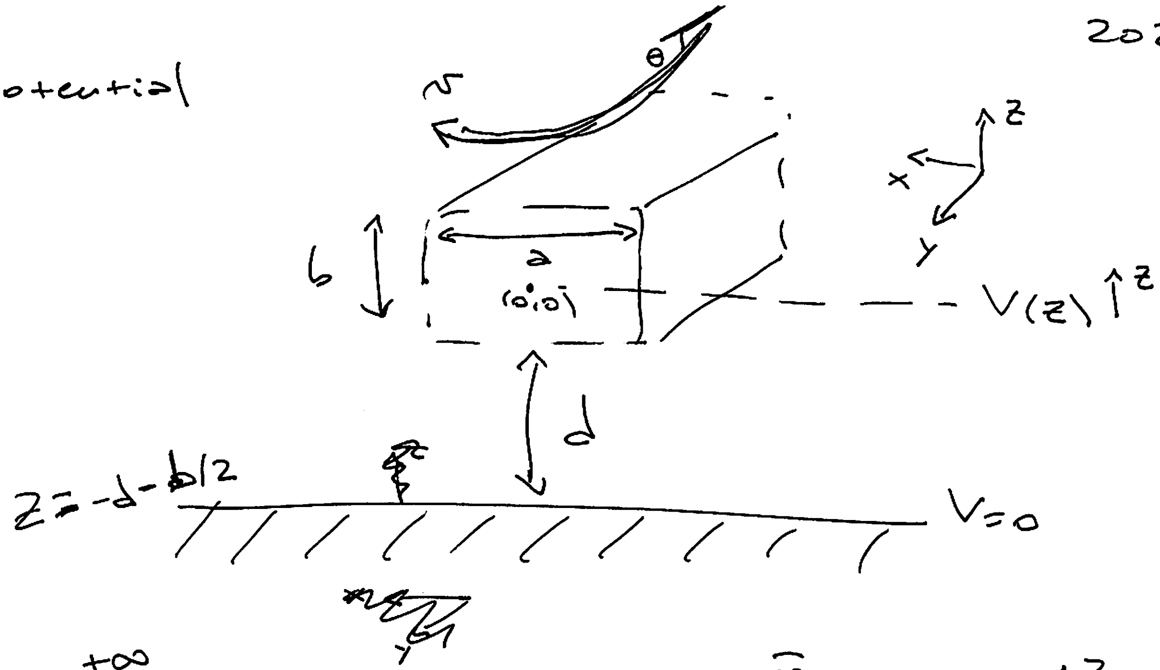
Potential

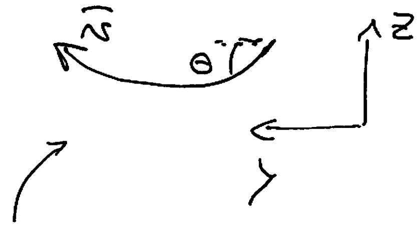
2025-05-27

1



$$\int_{z=-d-b/2}^{+\infty} dz\, V(z)$$

image method



$v_{\perp+\infty} = v \operatorname{tg}\theta$

$v_y = v$

$v_z \rightarrow$ motion Equation

$$\frac{dz}{dt} = \sqrt{\frac{2eV(z)}{m\gamma} + v_{\perp\infty}^2}$$

$$\Delta = \frac{2e}{m\gamma} V(z) + v_{\perp\infty}^2 \Big|_{z=z_{min}} = 0 \Leftrightarrow z_{min} = z$$

$$\frac{V(z)_{min}}{V_0} = -\frac{v_{\perp\infty}^2}{V_0} \frac{m\gamma}{2e}$$

$$\frac{V(z_{min})}{V_0} = -\frac{v^2 \operatorname{tg}^2\theta}{V_0} \frac{m_e\gamma}{2e}$$

$v = \beta c$

$$= -\frac{\operatorname{tg}^2\theta}{V_0} (c^2 m_e) \frac{\beta^2\gamma}{2e}$$

value in eV

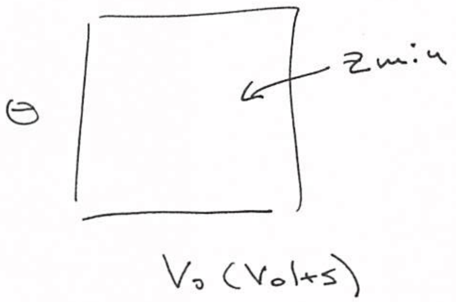
$$\frac{2e}{m_e\gamma}V(z)+v_{\perp\infty}^2\Big|_{z=z_{min}}=0$$

$$\frac{V(z_{min})}{V_0} = -\frac{v_{\perp\infty}^2}{V_0}\,\frac{m_e\gamma}{2e}$$

$v=\beta c,\ v_{\perp\infty}=v\,tg\,\theta$

$$\frac{V(z_{min})}{V_0} = -\frac{tg^2\theta}{V_0}\,\boxed{c^2 m_e}\,\frac{\beta^2\gamma}{2e}$$

value in eV = e.V → $[V_0]=V$, $[e]=e$ } cancel out



$$\boxed{\frac{V(z_{min})}{V_0}=\frac{c^2 m_e}{V_0\cdot e}\left[-\frac{tg^2\theta\,\beta^2\gamma}{2}\right]}$$

↳ zmin satisfies this equation