$$H' = x_2^2 + v x_3^2 + 2v_0 x_1 \qquad H' = E$$

$$x_2^2\left(1-\frac{v_0}{I}\right) + x_3^2\left(v-\frac{v_0}{I}\right) = E - 2v_0 I \quad \Big/ \cdot \frac{1}{(E-2v_0 I)}$$

$$v = \frac{v_0}{I}$$

$$v_0 = v I^2$$

$$\Rightarrow (E - 2vI^2)$$

$$x_2^2\left(\frac{1-v}{E-2vI^2}\right) + x_3^2\left(\frac{v-v}{E-2vI^2}\right) = 1$$

$$a = \left(\frac{1-v}{E-2vI^2}\right)^{-\frac{1}{2}} \qquad b = \left(\frac{v-v}{E-2vI^2}\right)^{-\frac{1}{2}}$$

$$\frac{x_2^2}{a^2} + \frac{x_3^2}{b^2} = 1$$

$$\boxed{\begin{array}{l} v = f(A_1, A_2, A_3) \\ v = f(A_1, A_2) \end{array}} \qquad \boxed{\begin{array}{l} a = f[I, E, v) \\ b = f[I, E, v, v) \end{array}}$$

→ fix I, j, θ (A)

→ fix A_1, A_2, A_3 (B)

$\boxed{(B) + (A)}$ ⇒

→ calculate $(v, v_0) \rightarrow (v, v)$

→ calculate $a_E = f(I, v)$ → for fixed E

$b_E = f(I, v, v)$

$$\boxed{\frac{x_2^2}{a_E^2} + \frac{x_3^2}{b_E^2} = 1} \quad (A)$$

→ fix E

- get a_E, b_E
- solve eq (A)

quantization → $\{ x_2, x_3$

(1)-axis: $x_2 = r \sin\theta \cos\varphi$; $x_3 = r\sin\theta \sin\varphi$

(2)-axis: $x_2 = r\cos\theta$; $x_3 = r\sin\theta \sin\varphi$; $r \in [0, I]$

(3)-axis: $x_2 = r\sin\theta \sin\varphi$; $x_3 = r\cos\theta$

• Solve$\left[\frac{x^2}{a_E^2} + \frac{y^2}{b_E^2} == 1,\ y\right]$ → get solution for $y = f(x)$

→ Plot$[\, y_{sol} = f(x),\ x\,]$

• ContourPlot$\left[\frac{x^2}{a^2} + \frac{y^2}{b^2} == 1,\ x \in [\ ],\ y \in [\ ]\right]$

I - fixed: v, V

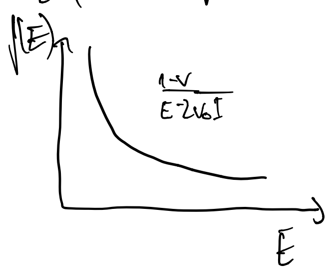
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = E - 2v_0 I$$

$E \to a_E(v_I, V_I)$

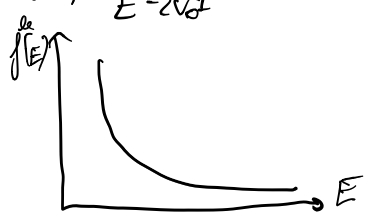
$b_E(v_I, V_I)$

$$\frac{x_2^2}{a^2} + \frac{x_3^2}{b^2} = E - 2v_0 I$$

$$f^a(E) = \frac{1-V}{E - 2v_0 I}$$

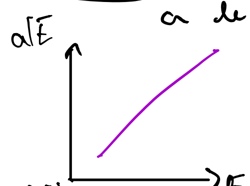


$$f^b(E) = \frac{v-V}{E - 2v_0 I}$$

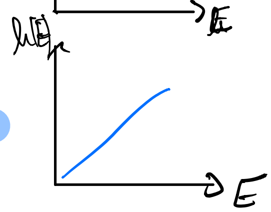


a b

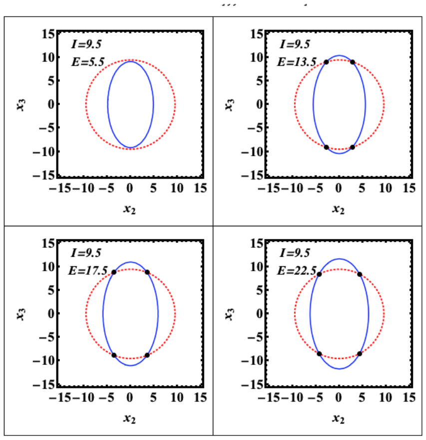
$$a(E) = \frac{1}{\sqrt{\frac{1-V}{E-2VI^2}}}$$



$$b(E) = \frac{1}{\sqrt{\frac{v-V}{E-2VI^2}}}$$



• see difference between two curves



← Final results for H' + AM