1. a. \( V_x = \frac{V_{1/2}}{W_b} \leq 1 \) braking.

\[ V_{1/2} \sim V_{vi} \sim \frac{V_{vi}}{\Omega_2} \text{ from stepped function} \]

\[ T_b \sim \frac{2\pi}{\omega_0} \sim \frac{\pi}{\sqrt{2}} \int_{\nu_i}^{\nu_{1/2}} \frac{ds}{V_{1/2}} \sim \frac{R_0 g}{V_{1/2} \sqrt{\gamma}} \]

connection length \( ds = \hat{n} \cdot d\hat{x} \sim \left( \frac{\dot{\beta}_0}{\gamma} + \frac{\dot{\gamma}_0}{\gamma} \right) \cdot \left( \frac{R_d \phi + c d\phi}{\gamma} \right) \sim \frac{R_d \phi + c d\phi}{\gamma} \frac{d\theta}{R}, \]

\[ ds \sim R_d \phi \left( 1 + \frac{c R_d}{\gamma R} \right) \sim R_d \phi \]

\[ V_x \sim V_{vi} \frac{R_0 g}{V_{1/2} \sqrt{\gamma}} \leq 1 \]

b. 

2. a. On reduced by \( \gamma \) same stopped particles do not contribute. Also there is a new current \( T_{new} \) from DP.

b. \( \left( T_{new} \right) \sim \left( \frac{1}{\gamma} \text{ Drift} \frac{\text{Wigner cell}}{\text{Boot coeff}} \right) \left( \frac{-\nabla P}{\omega_0 \text{ E}_{11}} \right) \)

Get the Wigner cell, use charge symmetry:

\[ V_{new} \sim V \quad C_{w} \sim \frac{C_{11}}{\gamma_{11}} \]

\[ V_{w} \sim V_{dir} \gamma_{11} \sim V_{dir} \frac{\Delta V_{w_1}}{V_{w_1}} \]

\[ V_{dir} \sim \frac{1}{\gamma_{11}^{1/2}} \left( \mu_{dir} + \frac{\gamma_{11}^{1/2}}{\Delta V_{w_1}} \right) \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{R_{11}}{\gamma_{11}^{1/2}} \]

\[ \frac{\Delta V_{w_1}}{V_{w_1}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad V_{in} \sim \frac{E_{11}}{V_{1/2}} \text{ With condition} \]

\[ C \sim \frac{E_{11}^2}{\gamma_{11}^{1/2}} \left( \frac{R_{11} \gamma_{11}^{1/2}}{R_{11} \gamma_{11}^{1/2}} \right) \sim \frac{E_{11}^2}{\gamma_{11}^{1/2}} \frac{1}{\gamma_{11}^{1/2}} \sim \frac{E_{11}^2}{\gamma_{11}^{1/2}} \sim \frac{E_{11}^2}{\gamma_{11}^{1/2}} \]

\[ \frac{1}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]

\[ \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \quad \text{and} \quad \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \sim \frac{\gamma_{11}^{1/2}}{\gamma_{11}^{1/2}} \]
2. b. (continued) also, \( T_{out} \sim \#_{posing} \cdot e^{V_{th}} \)
\[ \frac{dP}{dP} \cdot e^{V_{th}} \sim \frac{V_{th}}{U_{B}} \]

3. Need \( V_{out} \).

Calculated \( \Delta \) in the same way as in the previous \( V_{th} \), \( U_{B} \).

\[ P_{th} = M_{R} V_{th} + e_{R} A_{th} = M_{R} V_{th} - e_{R} \rho_{C} \]

\[ P_{(b), \text{theory}} = -e_{R} \rho_{C} \]

\[ P_{(b), \text{mid-plane}} = m \left( \rho_{B} + \rho_{C} \right) V_{th} - e_{R} \rho_{C} \]

\[ \Delta \left( \rho_{B} + \rho_{C} \right) \approx \frac{\beta}{\rho_{C}} + \frac{\rho_{B}}{\rho_{C}} \frac{\Delta \beta}{\rho_{C}} = \frac{4}{\rho_{C}} + \Delta \beta \frac{P_{B}}{\rho_{C}} \]

\[ \rightarrow \quad 0 = m \left( \rho_{B} + \rho_{C} \right) V_{th} - e_{R} \rho_{C} \left( \frac{P_{B}}{\rho_{C}} \right) \]

\[ \rho_{B} = \frac{m V_{th}}{E_{B}} \approx \frac{m V_{th} e^{1/2}}{E_{B}} \approx \left( \frac{E_{B}}{E_{B}} \right)^{1/2} \frac{m V_{th}}{E_{B}} \]

\[ \rho_{B} \approx \frac{2^{1/2}}{E_{B}} \]

\[ \Delta \rho_{C} \approx \frac{2^{1/2}}{E_{B}} \left( \frac{E_{B}}{E_{B}} \right) \frac{V_{th}}{E} \approx \frac{V_{th} 2^{1/2} e^{-3/2}}{E} \]

\[ \Gamma_{new} \sim \frac{V_{th}}{e} \rho_{C} 2^{1/2} e^{-3/2} \rho_{B} + \frac{e}{E_{B}} \]

\[ \Gamma_{new} \sim \frac{V_{th}}{e} \rho_{C} 2^{1/2} e^{-3/2} \rho_{B} + \frac{e}{E_{B}} \]