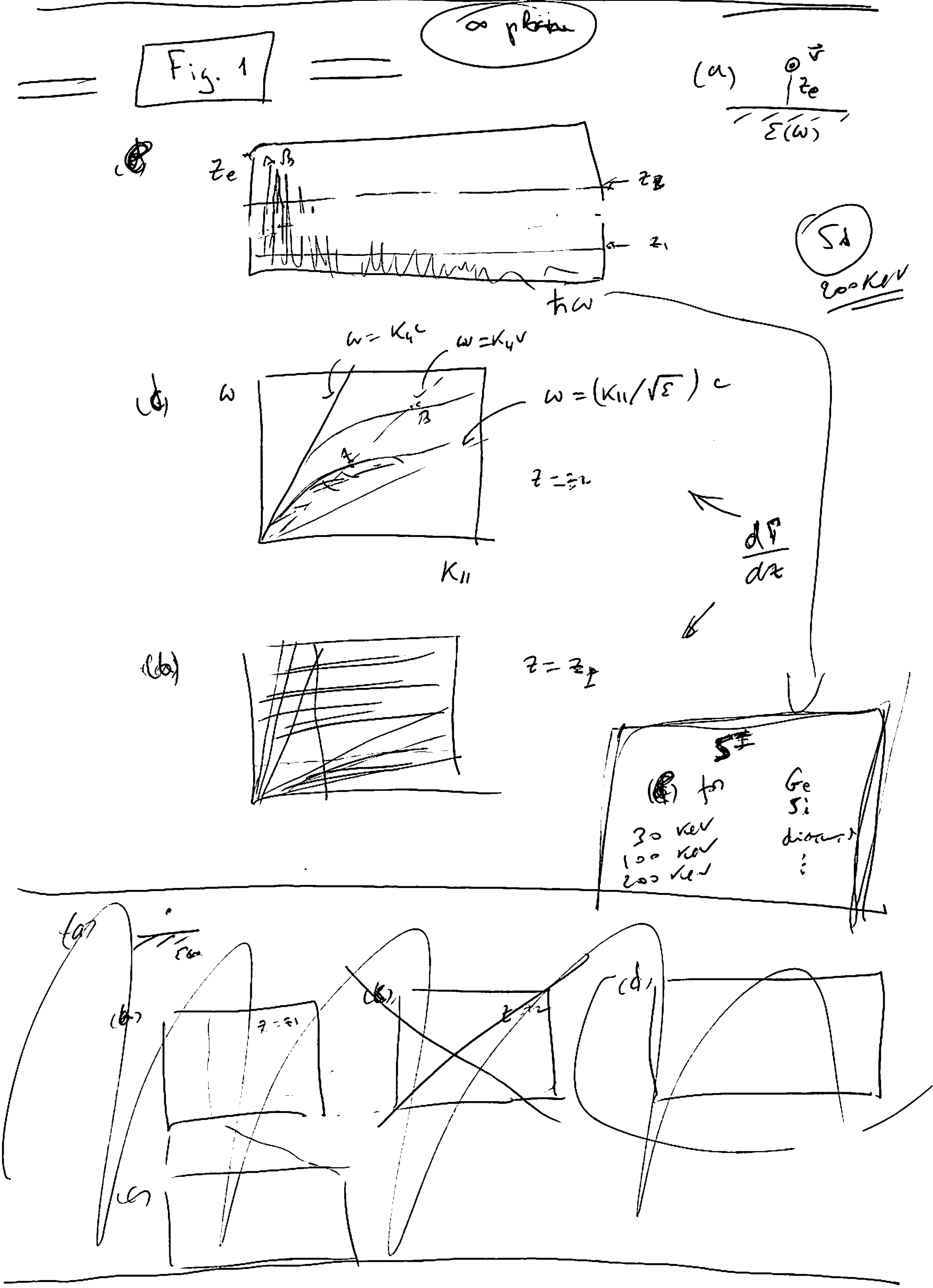
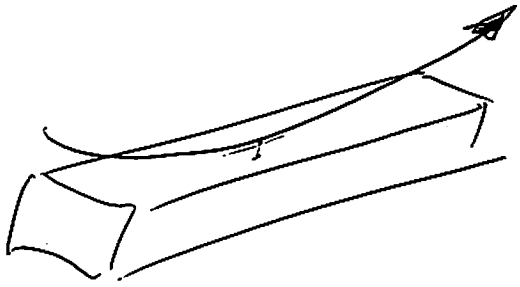
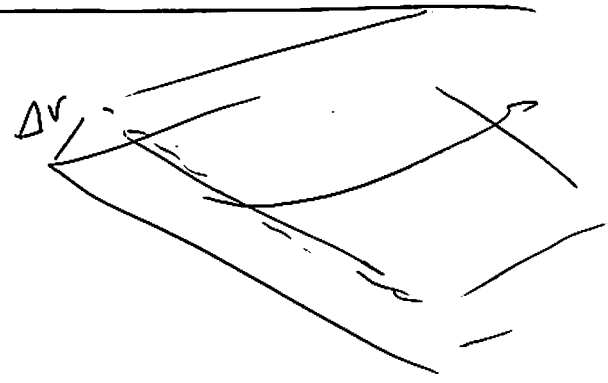
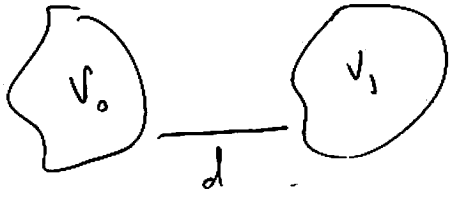
30-iv-2025
1650

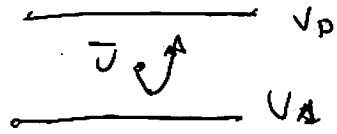
Fig. 1





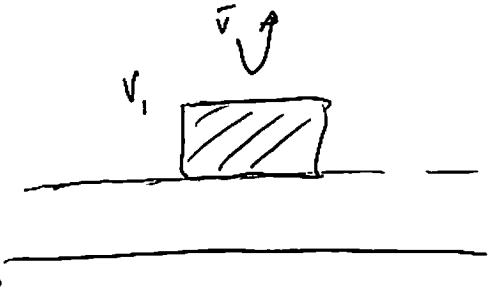




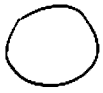


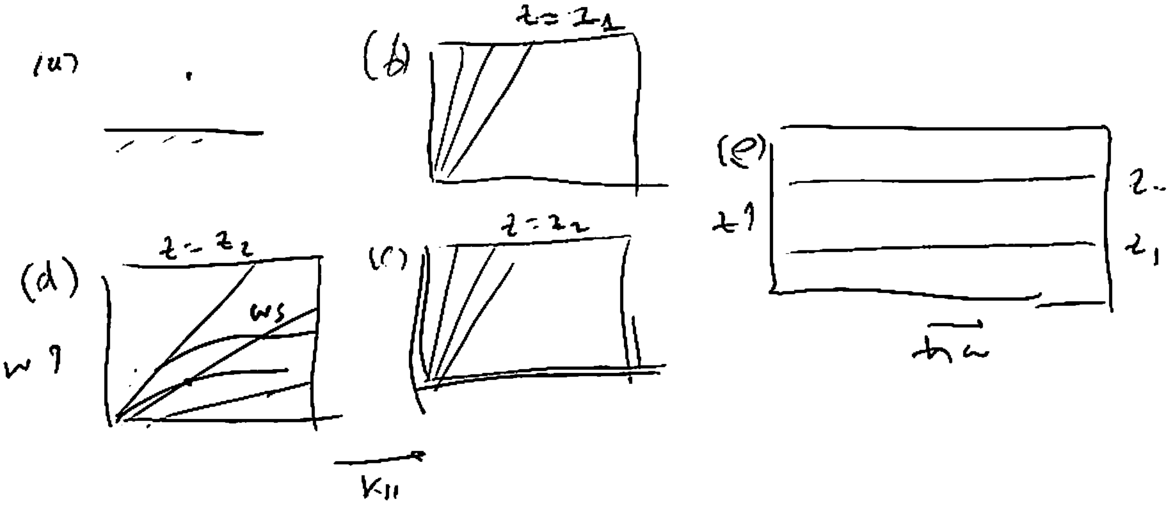
$d \to \infty$

$E \to 0$



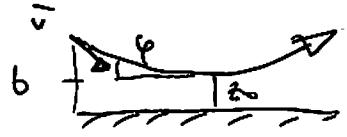
$V_1 - V_0 < 0$





(b)
z = z1
(d)
z = z2
ws
(e)

= Fig. 2 — ∞ plane



v, φ, b → z₀
E

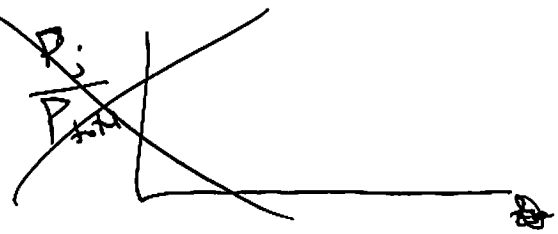
200 keV

$P_j = \int_{\Delta\omega_j} \int_{\text{trans. } j} \Gamma(\omega_j)$

$P_{total} = \int_0^\infty d\omega \int_{\text{trans}} \Gamma(\omega)$

ω_j from Eqn Fig 1d

$j = 1, 2$



$\varphi = \begin{cases} 0.1 \text{ mrad} \\ 1 \text{ mrad} \\ 10 \text{ mrad} \end{cases}$

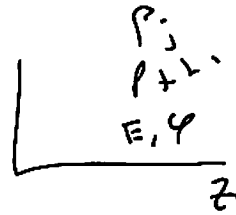
$E = \begin{cases} 1 \text{ V/nm} \\ 0.1 \text{ V/nm} \\ 0.01 \text{ V/nm} \end{cases}$

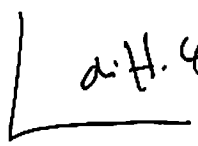
$P_1 \sim 10$

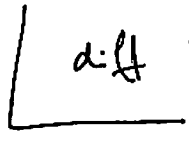
$P_1 / P_{tot} \sim \approx .8$

Fig. 2

(a)





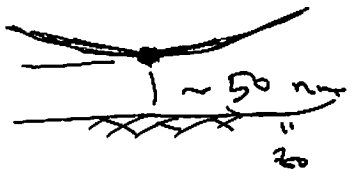


perhaps

200 keV = E_0

$E_\perp \approx E_0 \varphi^2$ $\quad \varphi \approx \begin{pmatrix} 1 \\ 10 \end{pmatrix}$ mrad

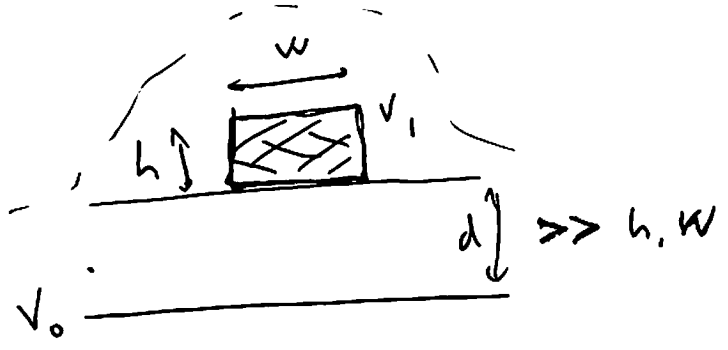
$E_\perp \approx \begin{pmatrix} 0.2 \\ 20 \end{pmatrix}$ eV

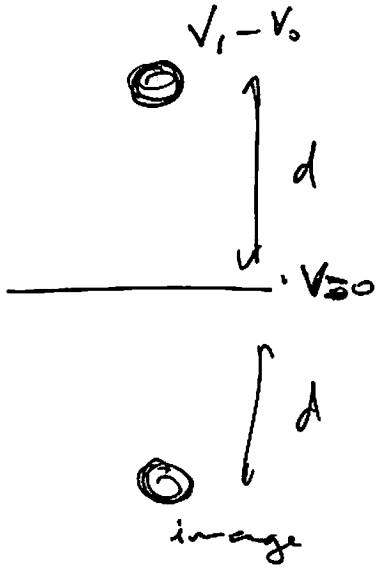


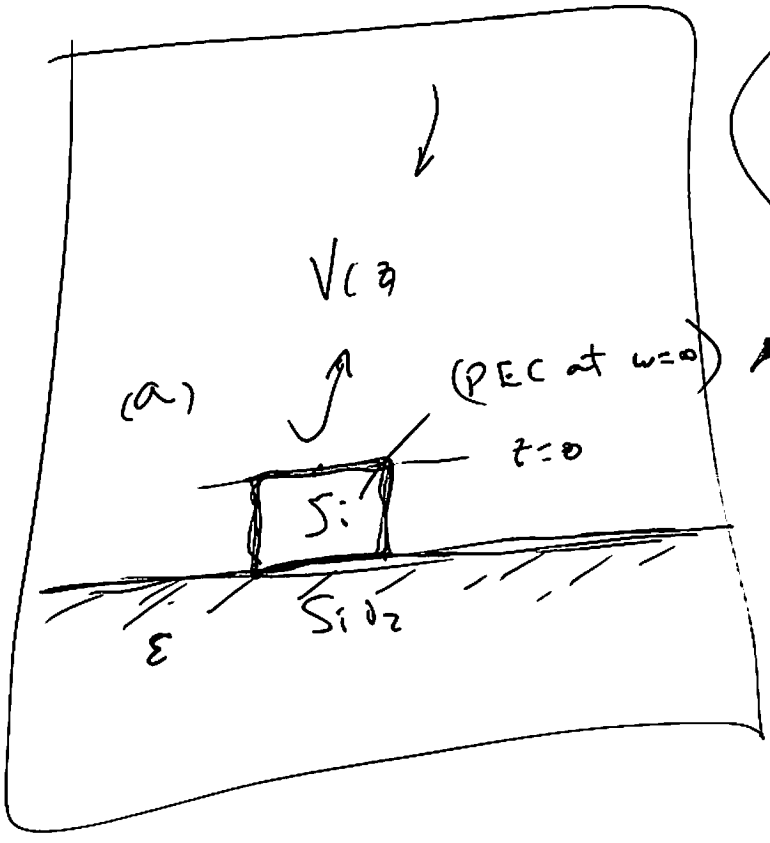
$E = \frac{E_\perp}{e z_0} = \begin{pmatrix} 4 \text{ mV/nm} \\ 0.4 \text{ V/nm} \end{pmatrix}$

1/10	× √10
1/√10	
1 mrad	
√10	
10	

Fig. 3

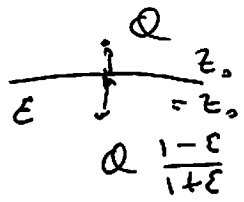






V(z) ?

(b) ρ P_1, P_2 φ, E_0, ~ $P_{1\sim}$



$$Q\left[\frac{1}{\sqrt{R^2+(z-z_0)^2}} - \frac{1}{\sqrt{R^2+(z+z_0)^2}}\cdot\frac{1-\varepsilon}{1+\varepsilon}\right] =$$

$$= \frac{Q}{\sqrt{R^2+(z+z_0)^2}} \cdot \left(1 - \frac{\sqrt{R^2+(1\cdot z_0)^2}}{\sqrt{R^2+(2z_0)^2}}\cdot\frac{1-\varepsilon}{1+\varepsilon}\right)$$

$$\hookrightarrow \left(1 - \frac{1-\varepsilon}{1+\varepsilon}\right)$$

$$\frac{Q}{\varepsilon}\,\frac{1}{r}\left(\frac{2}{\varepsilon+1}\right)$$