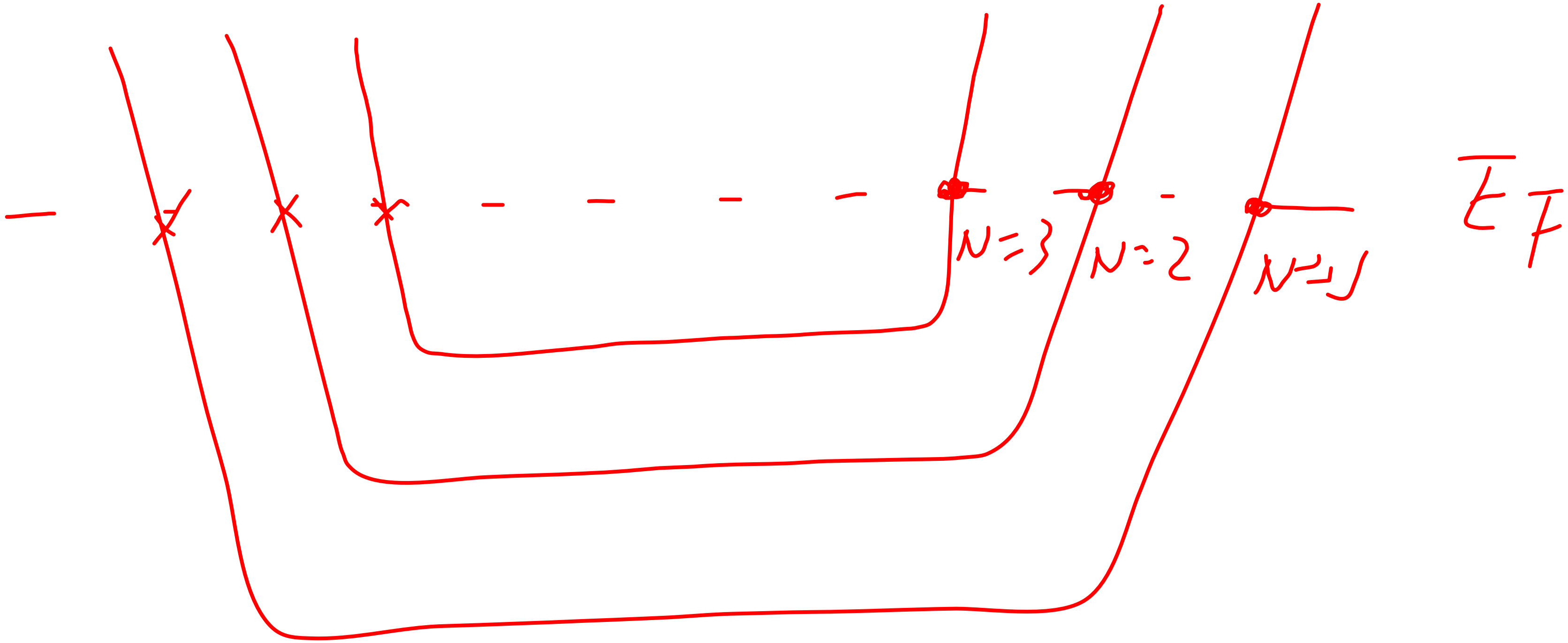


$N = 3$

High-field regime

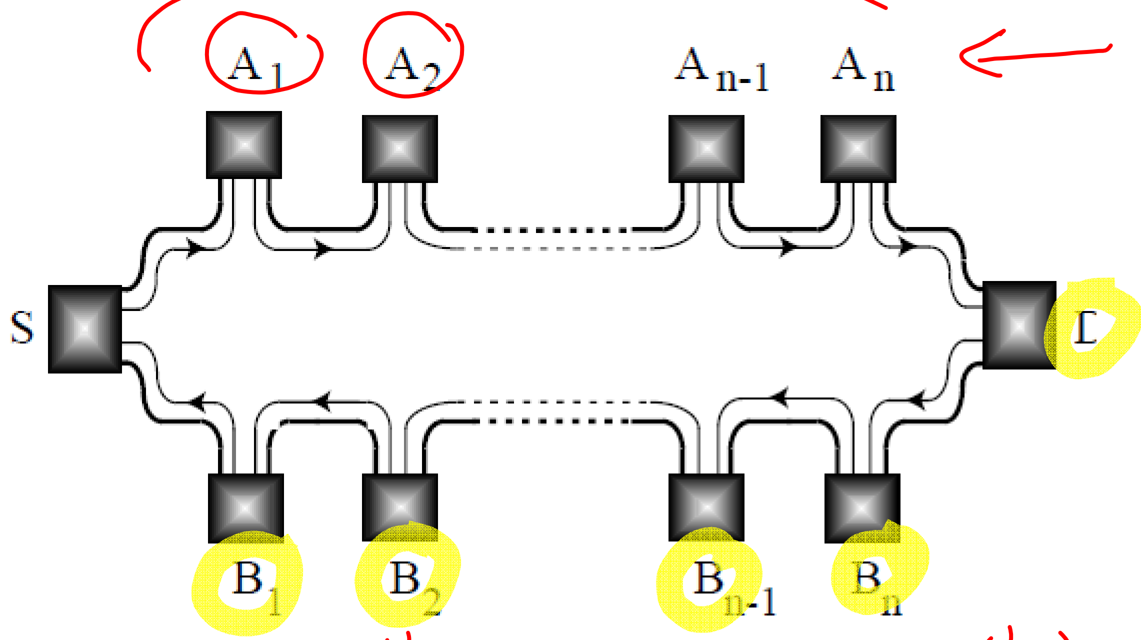
$\rho_{xx} \to 0$ & $\rho_{xy} = \dfrac{h}{\nu e^2}$

$\nu = N$

$$V_S N(e^2/h) - V_{B1} N(e^2/h) = I$$

$$V_{A1} N(e^2/h) - V_S N(e^2/h) = 0$$

No voltage drop



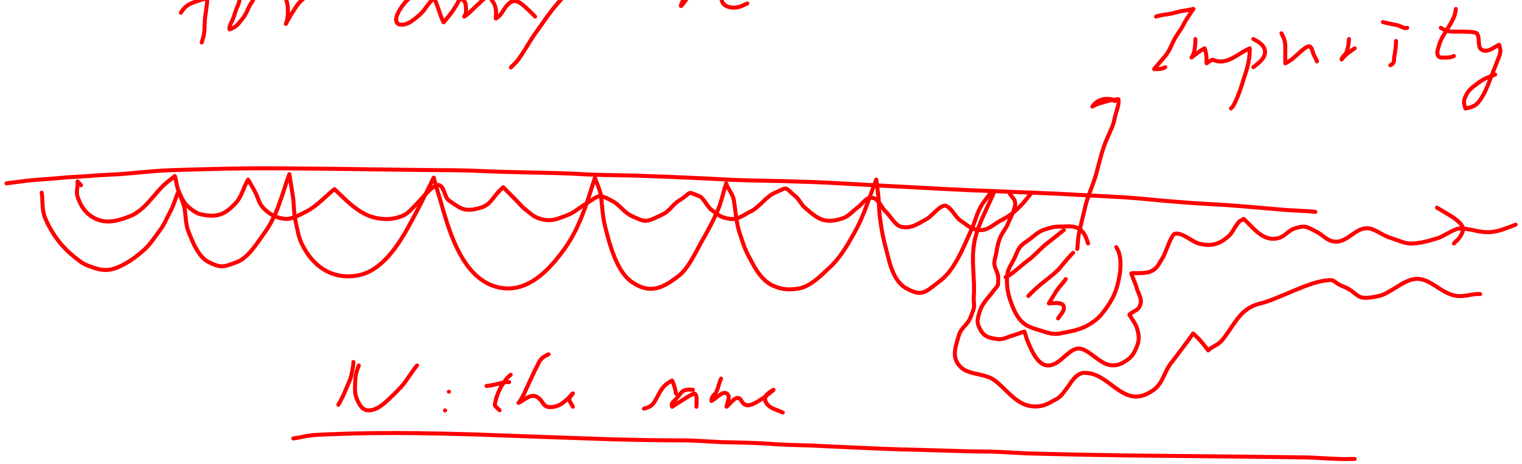
$$V_{A2} N(e^2/h) - V_{A1} N(e^2/h) = 0$$

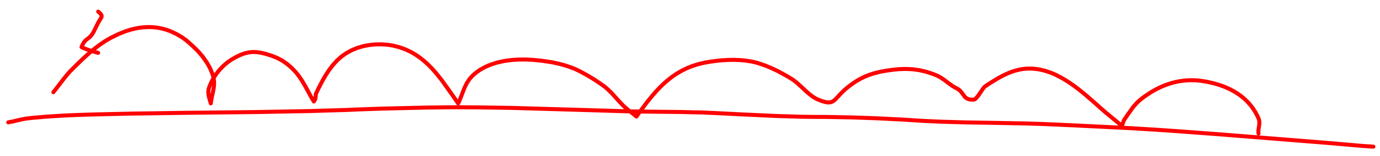
$$V_{An} N(e^2/h) - V_{An-1} N(e^2/h) = 0$$

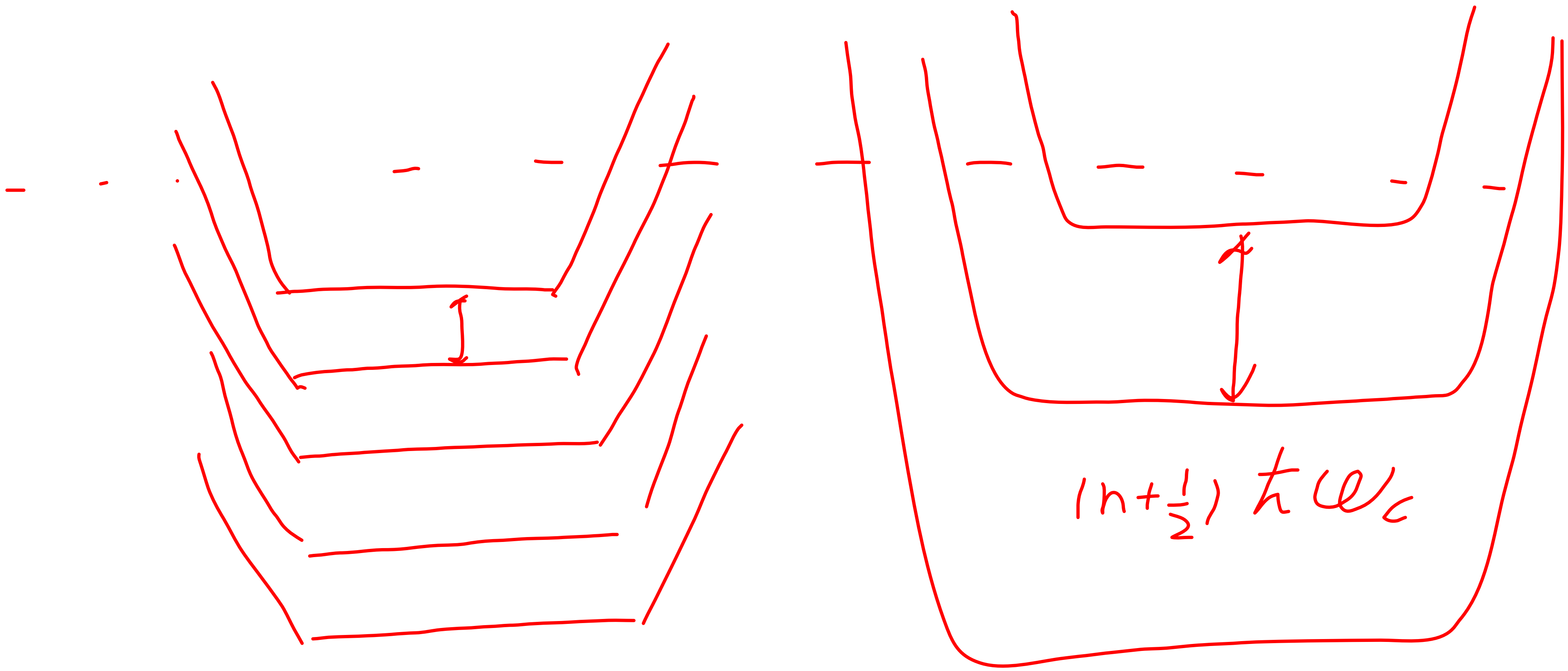
$$\frac{V_{A_n} - V_{B_n}}{I} = \frac{h}{\nu e^2}$$

ν

for any n







$N = 5$

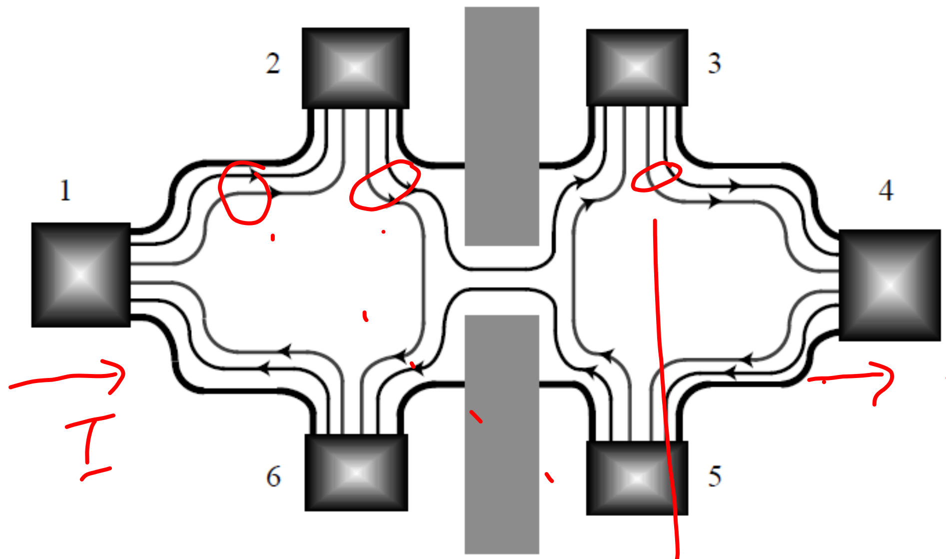
low $B_\perp$

$N = 3$

high $B_\perp$

$\omega_c = eB/m^*$

N: total
M: transmitted
N−M: reflected



$$I = V_1 N(e^2/h) - V_6 N(e^2/h) \quad (V_1)$$

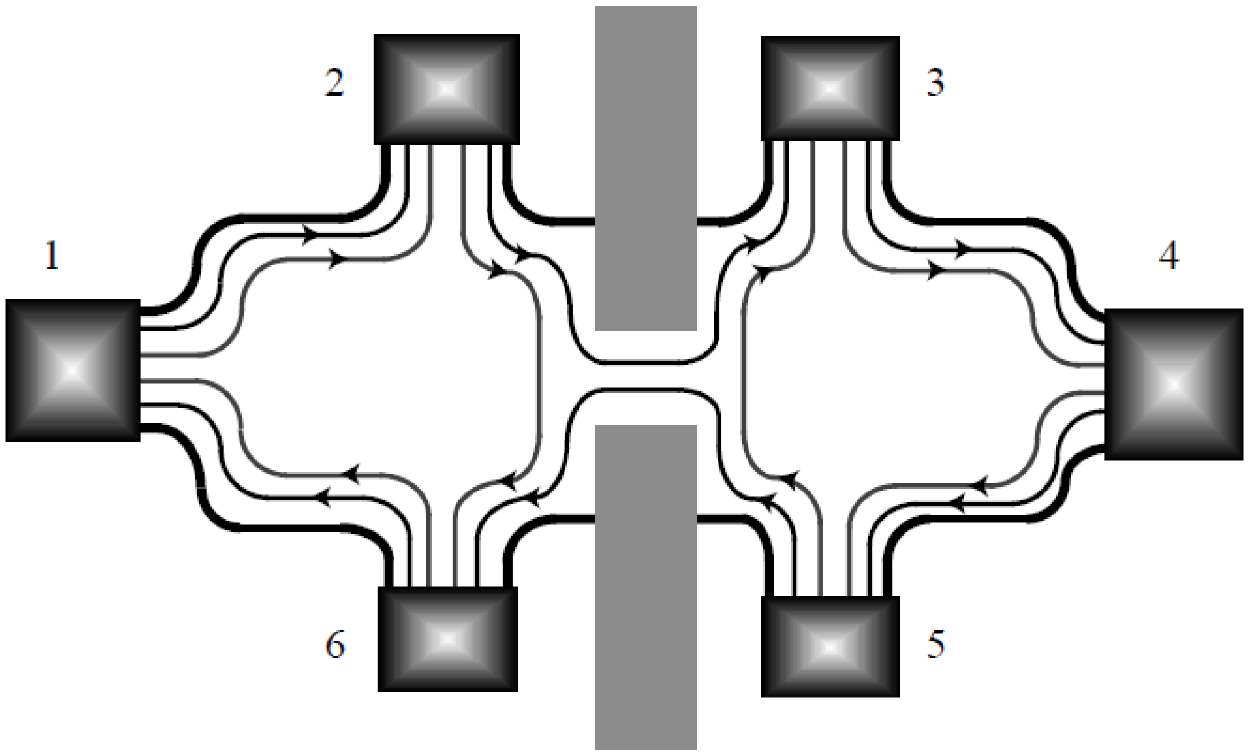
$$0 = V_2 N(e^2/h) - V_1 N(e^2/h) \quad (V_2)$$

$$0 = V_3 N(e^2/h) - V_2 M(e^2/h) - V_5 (N-M)(e^2/h) \quad (V_3)$$

$$-I = V_4 N(e^2/h) - V_3 N(e^2/h) \quad (V_4)$$

$$0 = V_5 (N)(e^2/h) - V_4 N(e^2/h) \quad (V_5)$$

$$0 = V_6 (N)(e^2/h) - V_5 M(e^2/h) - V_2 (N-M) e^2/h \quad (V_6)$$



$$R_{14,26} = \frac{V_2 - V_6}{I} = \frac{h}{Ne^2}$$

like in the bulk

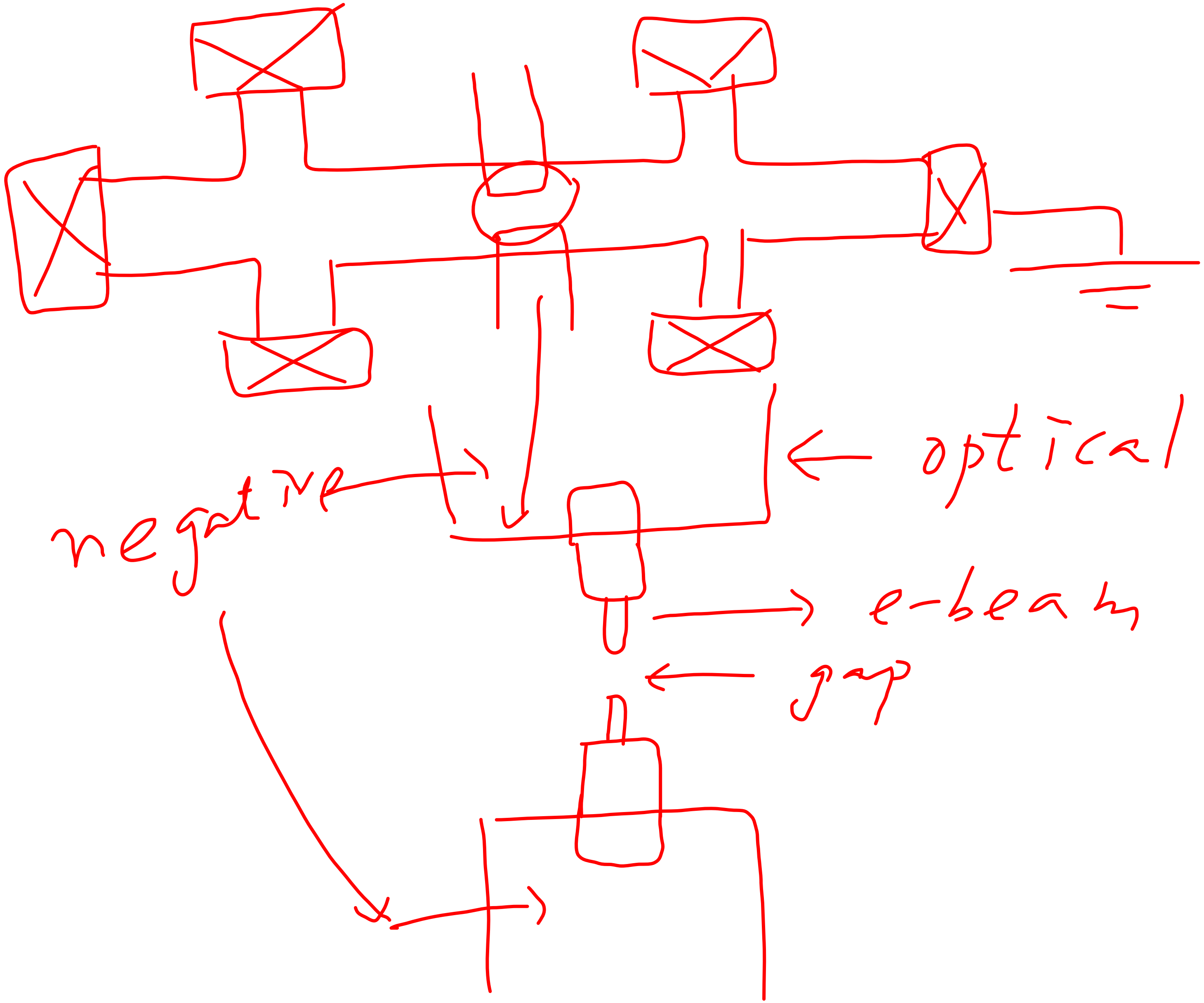
Depends on M only

$$R_{14,25} = \frac{V_2 - V5}{I} = \frac{h}{Me^2}$$

Diagonal

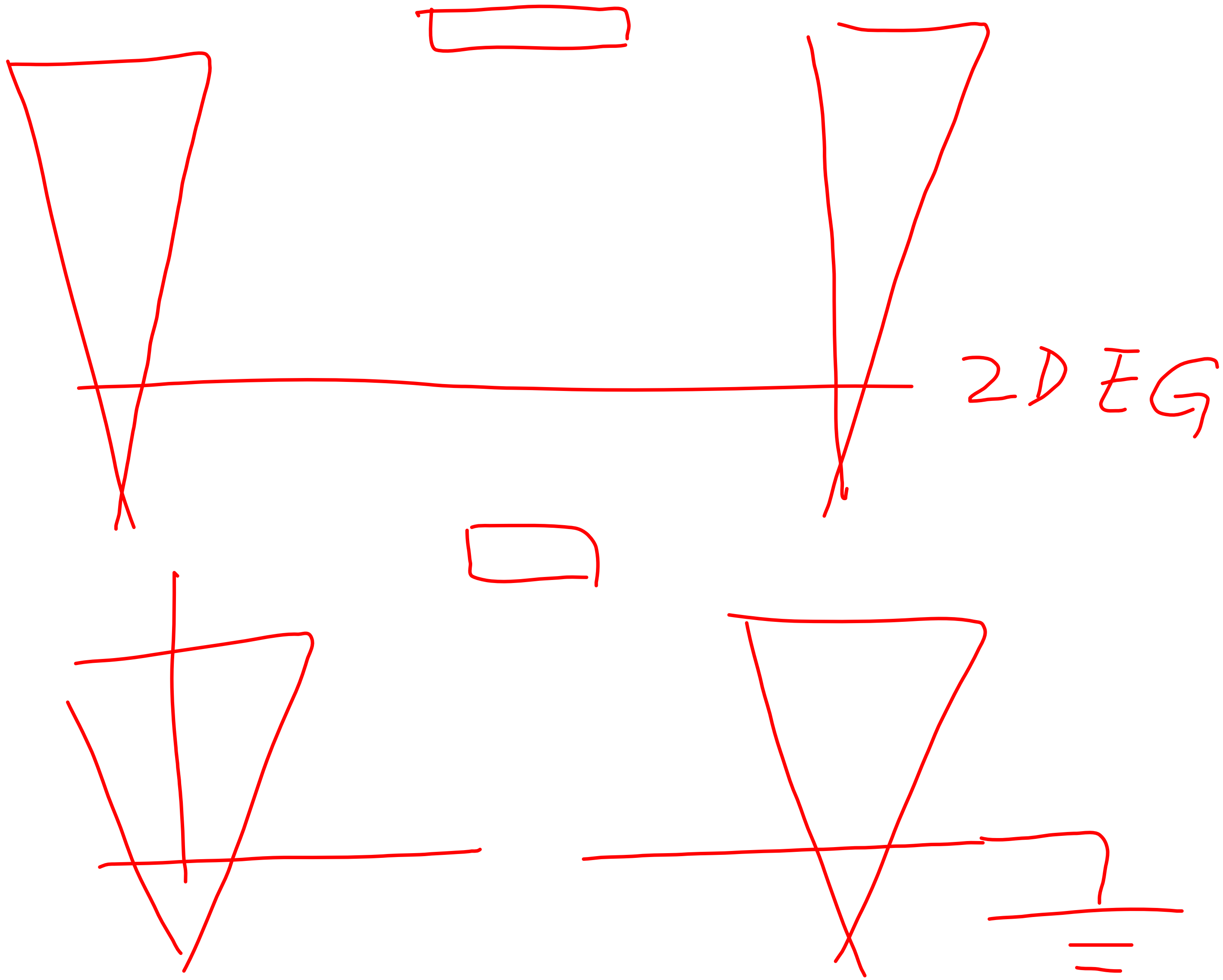
$$R_{14,23} = \frac{V_2 - V_3}{I} = \left(\frac{1}{M} - \frac{1}{N}\right)\frac{h}{e^2}$$

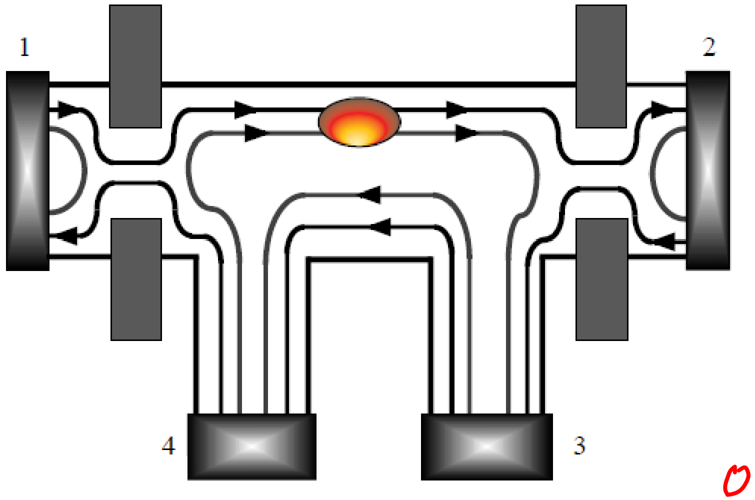
"fractional"


optical
negative
e-beam
gap

"fractional" quantization

$\neq$ fractional quantum Hall effect


2DEG



out $\qquad\qquad$ reflected

$N(e^2/h)V_1 - (N-M)(e^2/h)V_1$

$$
\begin{aligned}
I &= M\frac{e^2}{h}V_1 - M\frac{e^2}{h}V_4 \\
0 &= M\frac{e^2}{h}V_2 - (M-S)\frac{e^2}{h}V_1 - S\frac{e^2}{h}V_4 \quad (\text{for } V_2)
\end{aligned}
$$

current : 1 & 3

voltage : 2 & 4

?

$-I = (Ne^2/h)V_3 - M(e^2/h)V_2 - (N-M-S)e^2/h\, V_4$