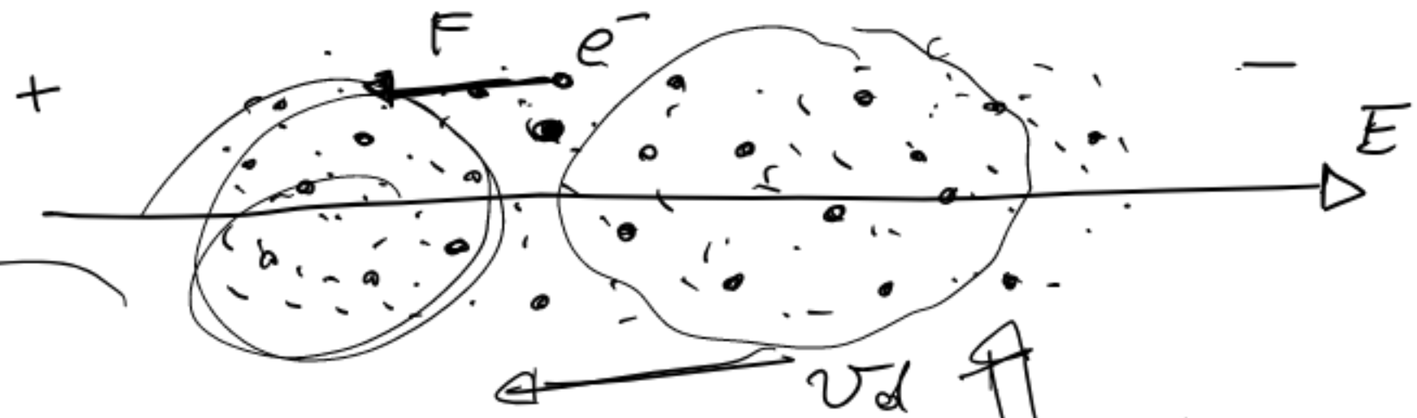
SEMICONDUTTORI

CONDUTTORI : e^- Banda conduzione = LIBERI



$P = V \cdot I$

$V = R \cdot I$

$P = R \cdot I^2$

Joule

v_d → $\frac{1}{2} m_e v^2$ → atomo → aumenta agitazione termica atomi → aumenta T → $P = R I^2$

T ↗ Prob. urto e^- - atomo ⇒ R ↗

$R(T) = R_0 (1 + \alpha T)$

$R(T_0)$

$n_c = 10^{28}\ e^-/m^3$

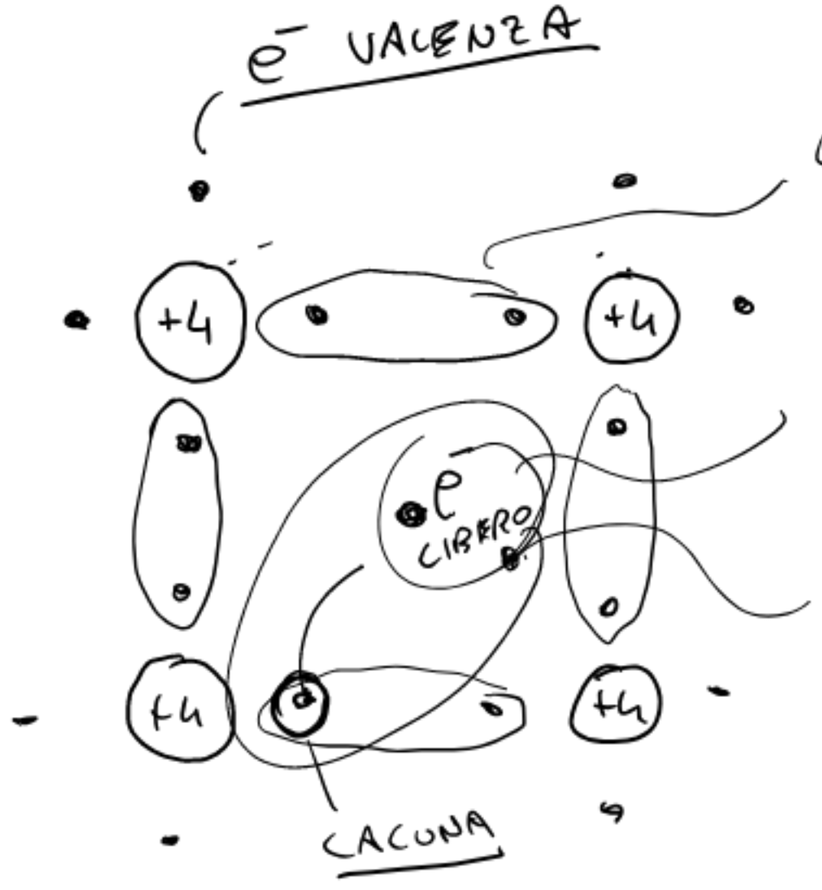
ISOLANTI ~~e^- LIBERI~~

$n_I \simeq 10^{7}\ e^-/m^3$

Non circola corrente.

ISOLANTI < SEMICONDUTTORI < CONDUTTORI

Si/Ge Si STRUTTURA CRISTALLINA TETRAVALENTE



LEGAME COVALENTE

Per agitazione T

e^- - LACUNA

conduzione

$T \uparrow \Rightarrow$ Agit. termica

$P(e^-\text{-lacuna}) \nearrow$ n_{e^-}

$\Rightarrow$ aumenta conducibilità

T ↑ R ↓

e^- ⇒ portatore conica M LIBBRO ⟹ Corrente elettrica I_M

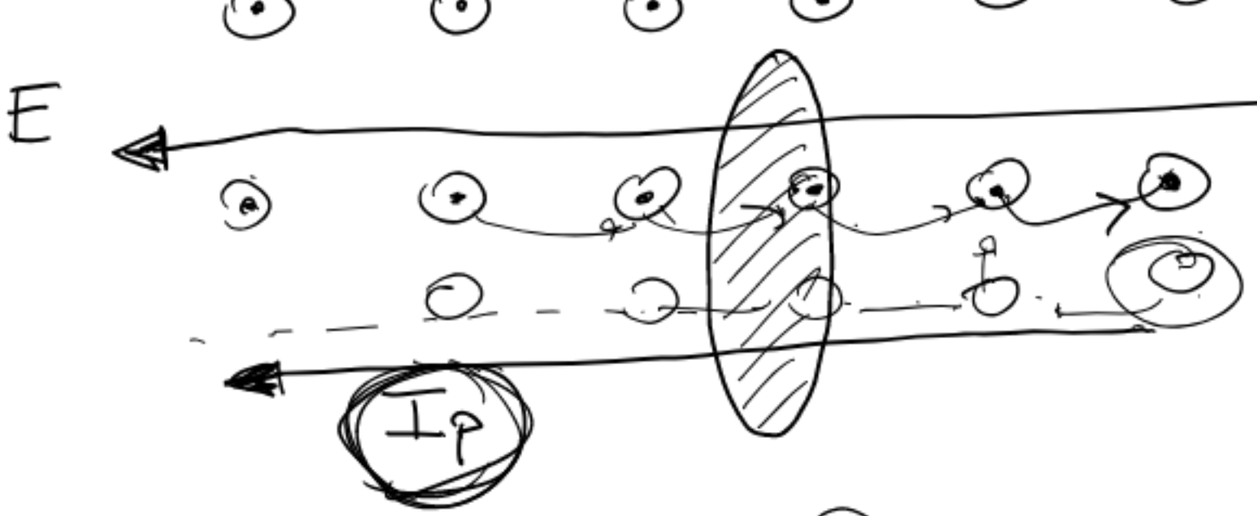
LACUNA ⇒ P portatore conca P LIBBRO ⟹ I_P

M — Concentrazione

P

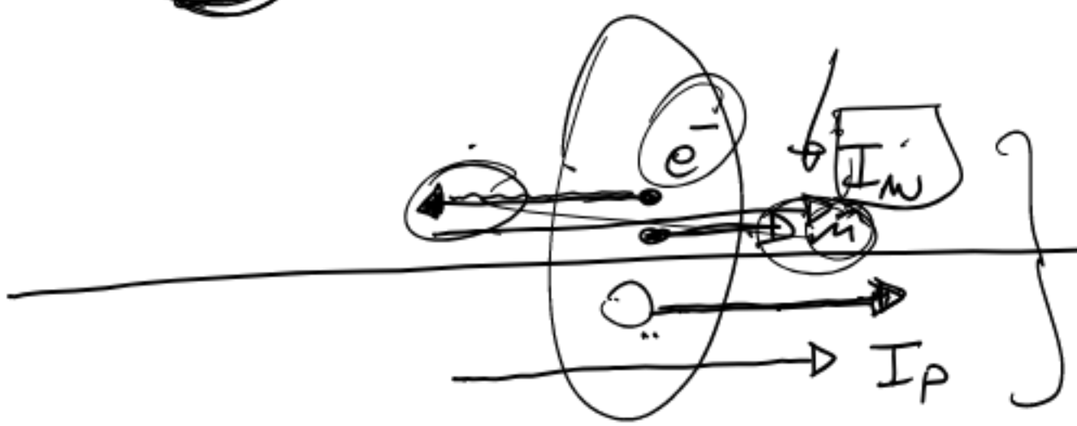
INTRINSECO

$M = P$



MOVIMENTO LACUNA

$I = \int_S j \cdot dS$



$$I_{SC} = I_M + I_P$$

SEMICONDUTTORI DROGATI

Elemento drogante → N / P

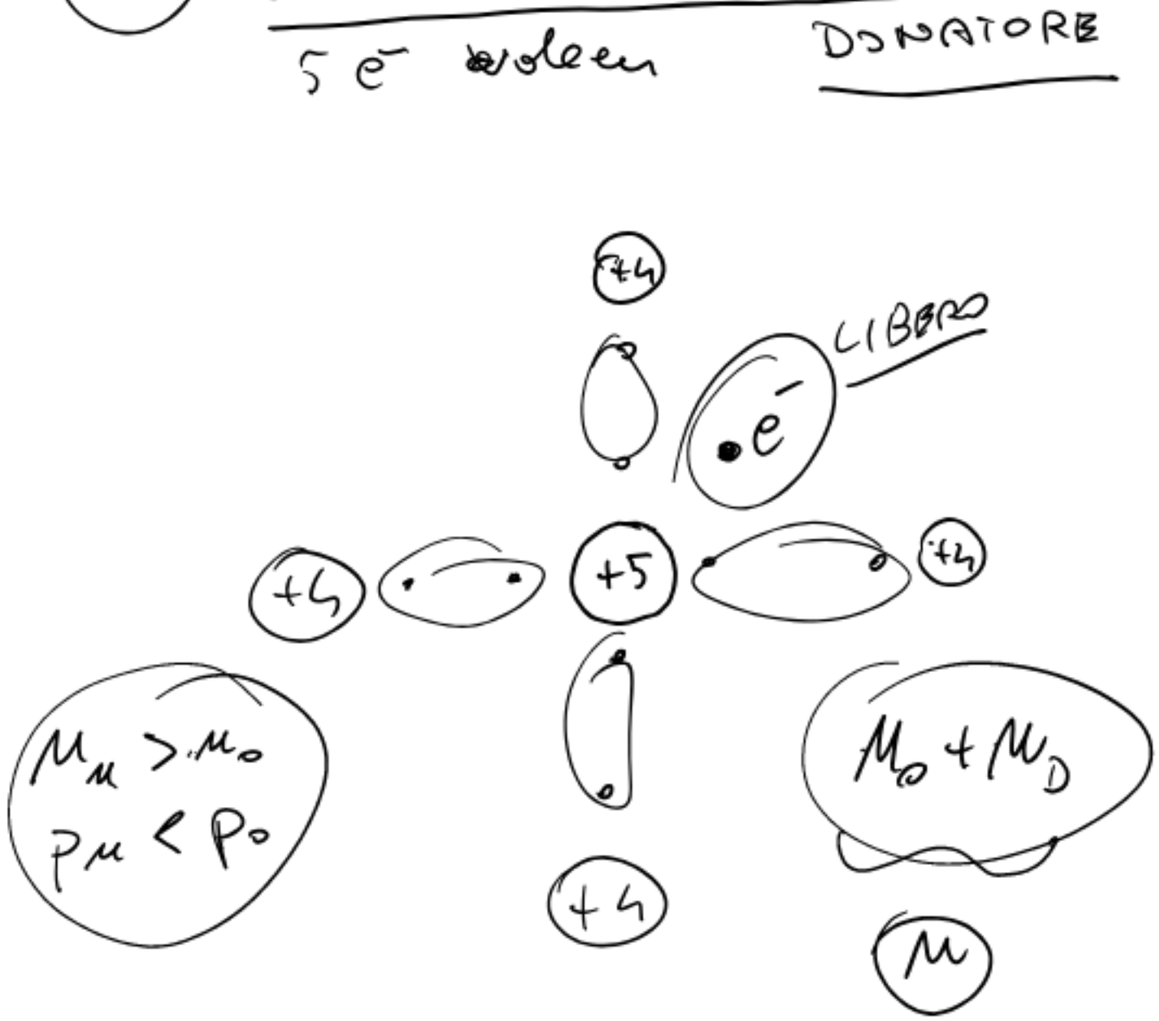
n_0, p_0 intrinseco

$$n \cdot p = \text{cost} = k$$

TIPO N $n > n_0$

e^- DROGANTE PENTAVALENTE

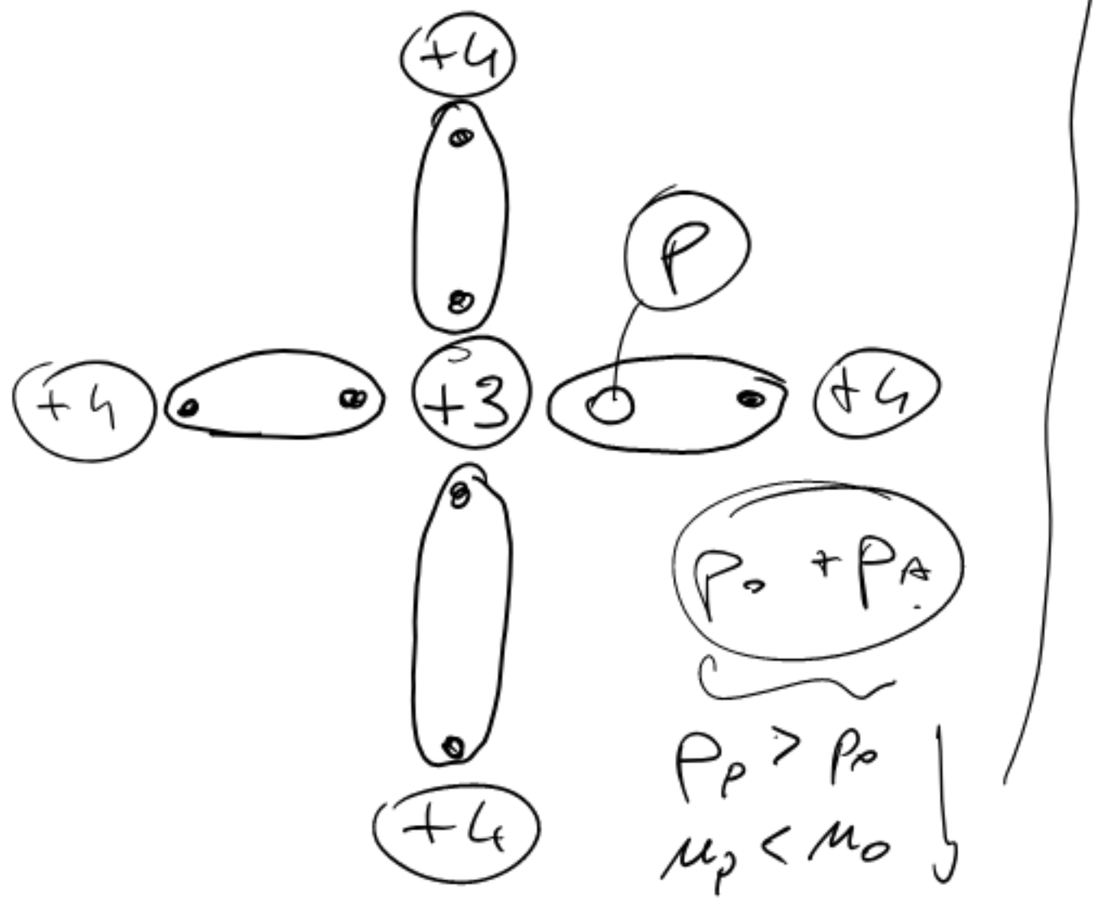
5 e^- valenza DONATORE



TIPO P $p > p_0$

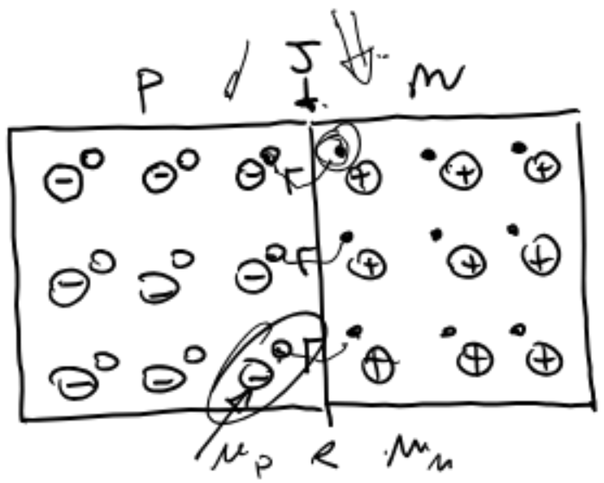
DROGANTE TRIVALENTE

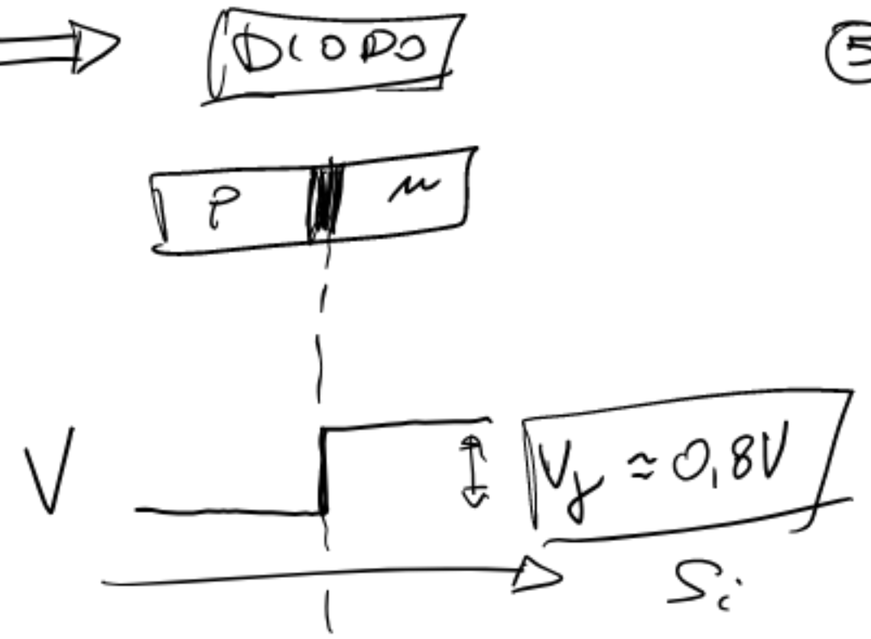
ACCETTORE



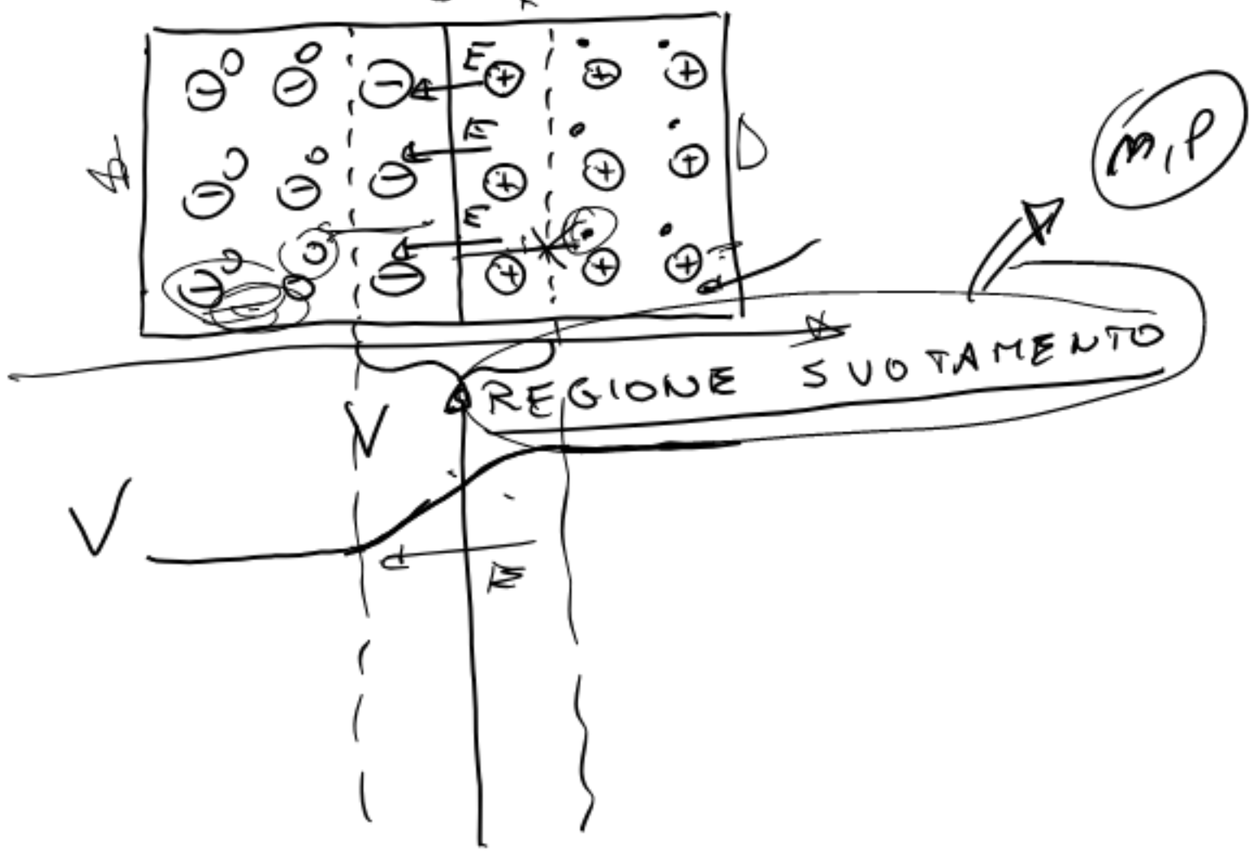
GIUNZIONE P-N ⟹ DIODO

INIZIALE

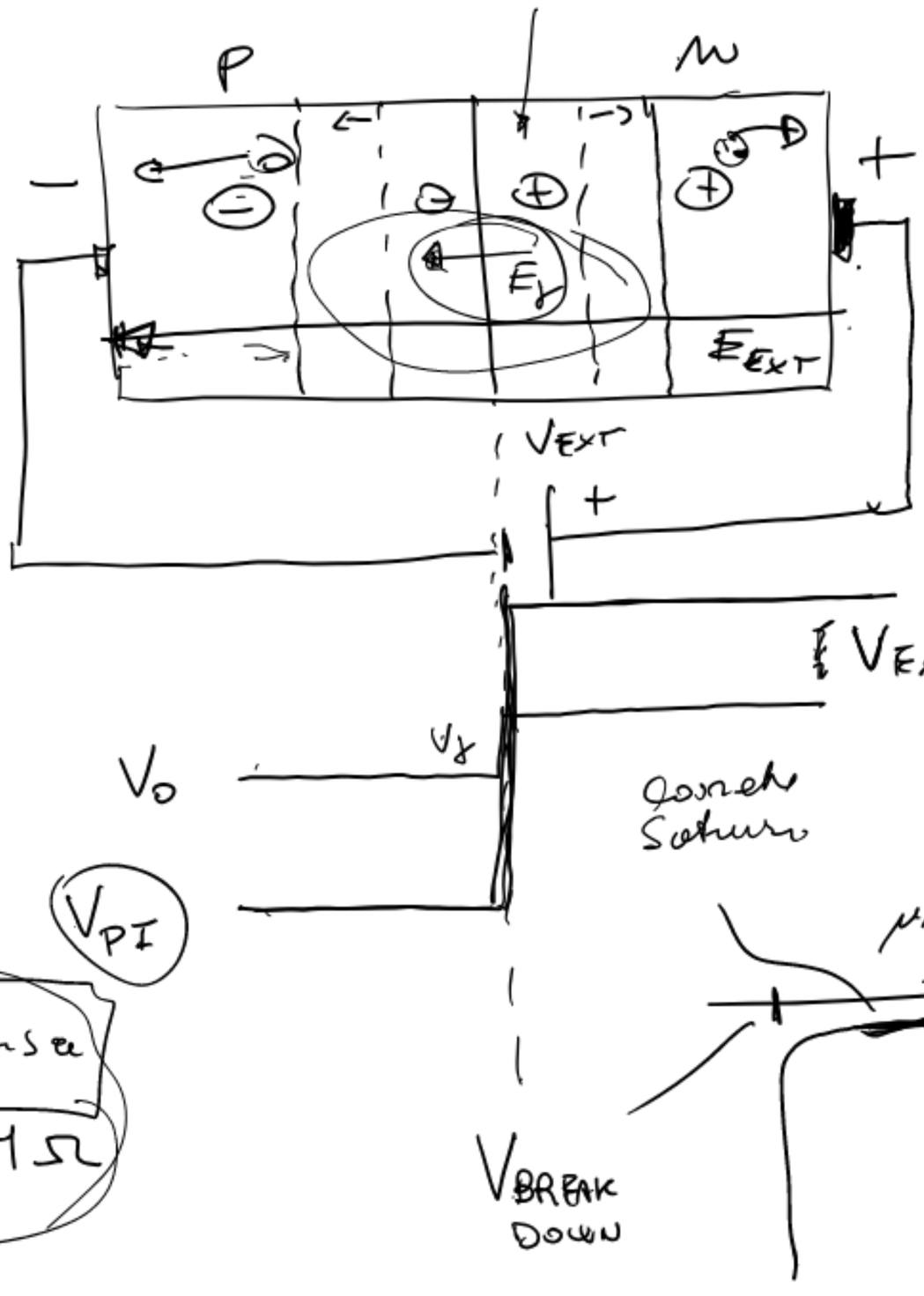




EQUILIBRIO



PN POLARIZZAZIONE INVERSA



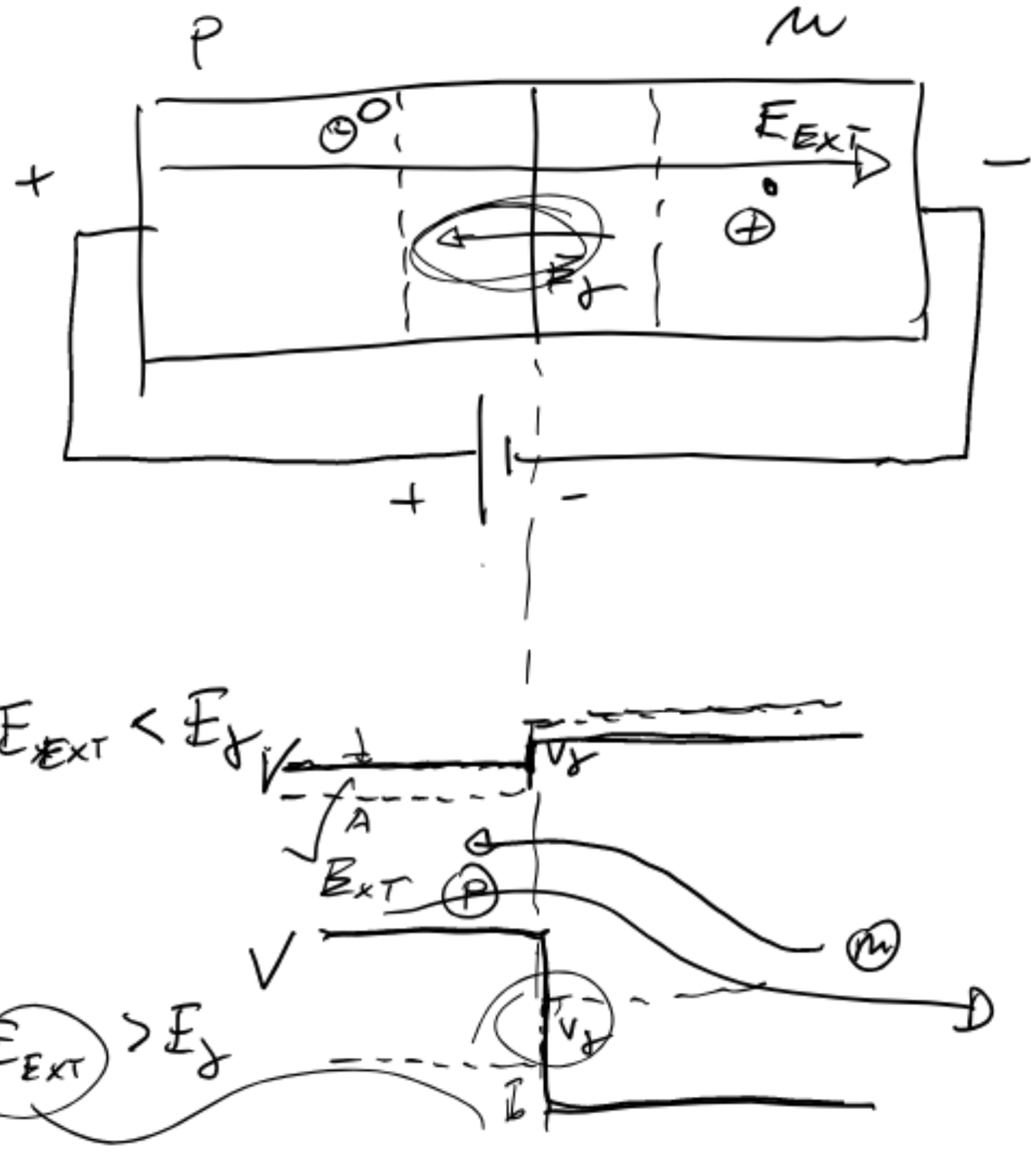
$I_0 \simeq 0$

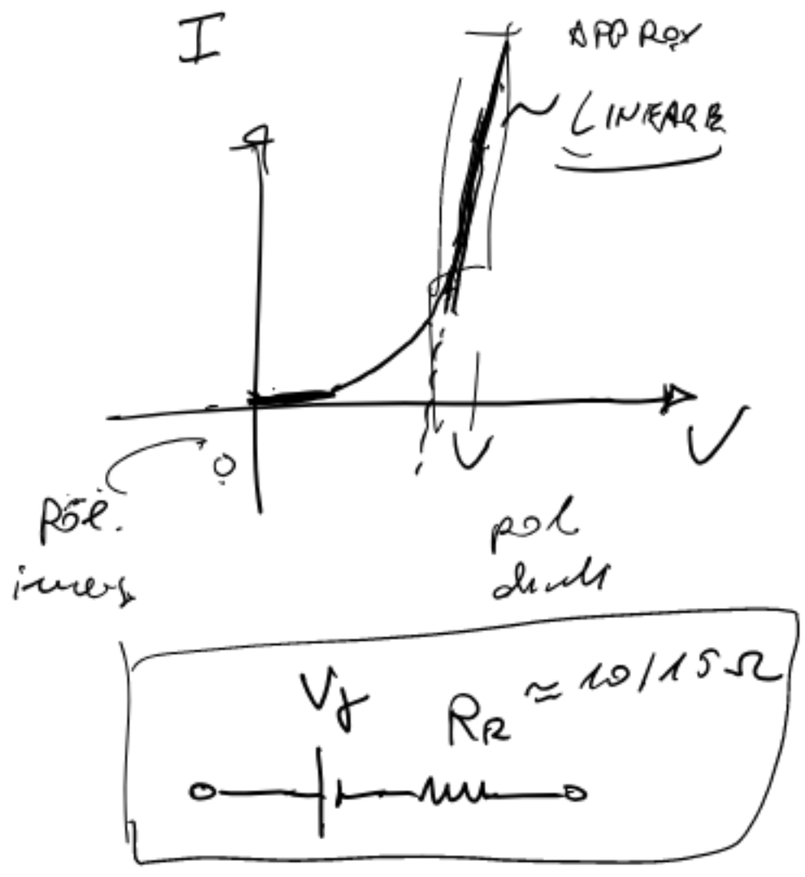
5/100 V

$I_0 \leq \mu A$

$e^- - p$ ricombinazione

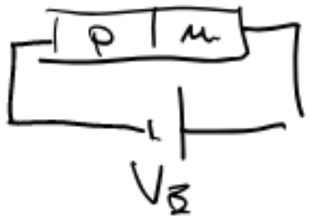
PM POLARIZZAZIONE DIRETTA



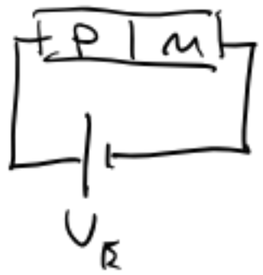


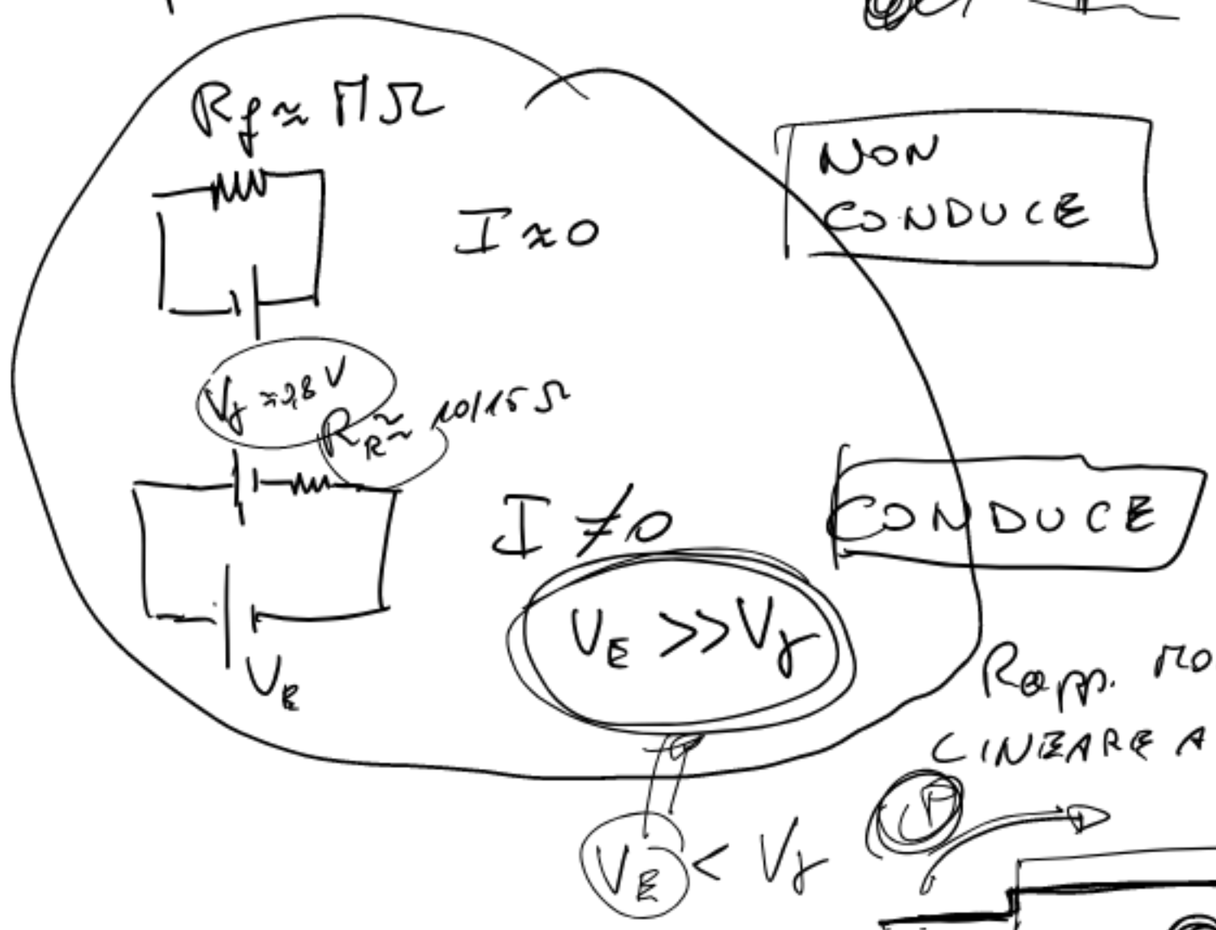
DIODO : giunzione pn

POL. INVERSA. $\simeq$

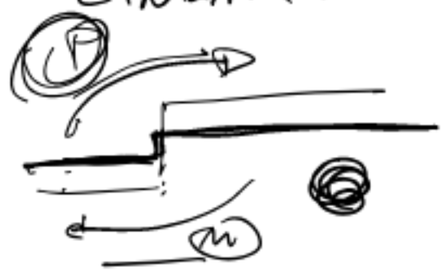


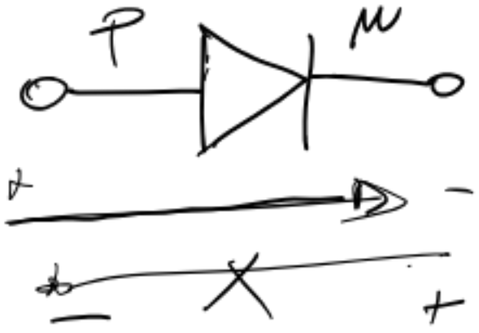
POL. DIRETTA $\simeq$





Rapp. MODELLO LINEARE A TRATTI





CONTATTO CHIUSO

u APERTO

Ponte a onda