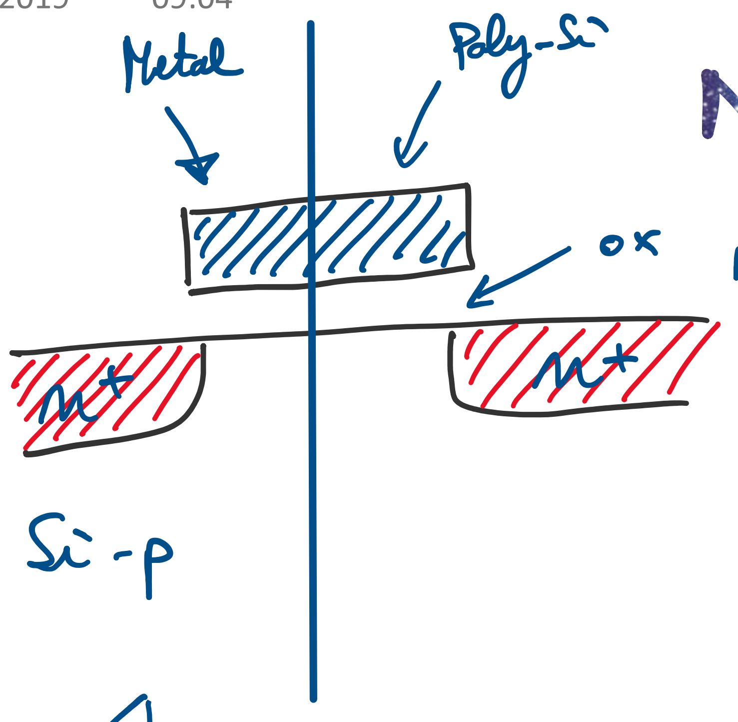
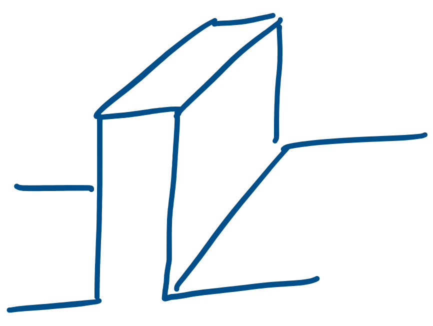
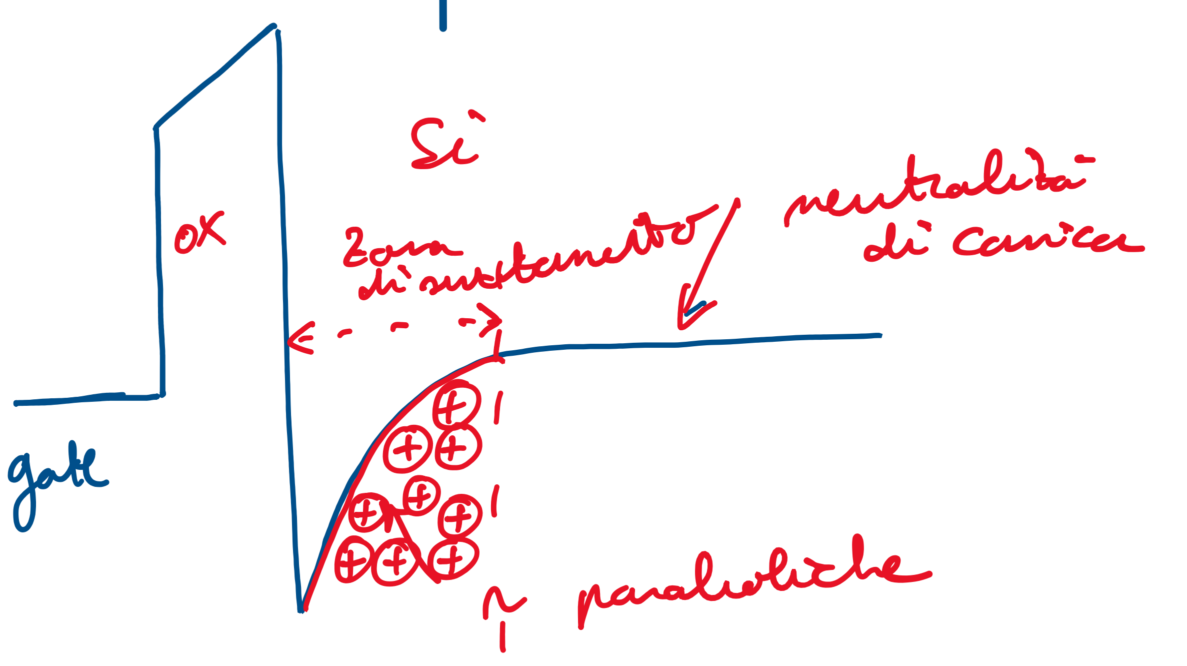
Friday, 8 November 2019 09:04

N-MOSFET



SiO_2
HfO_2 (high-K)





$$\nabla\cdot(\varepsilon(\vec r)\nabla\phi) = -q\rho(\phi)$$

$$n = N_c e^{-\left(\frac{E_c-E_F}{KBT}\right)}$$

$$\rho(\phi) = \left[-n(\phi)+p(\phi)+N_D^+(\phi)-N_A^-(\phi)\right]$$

$\phi(\vec r)$

1D $$\varepsilon\frac{\partial^2\phi}{\partial x^2} = -q\rho$$

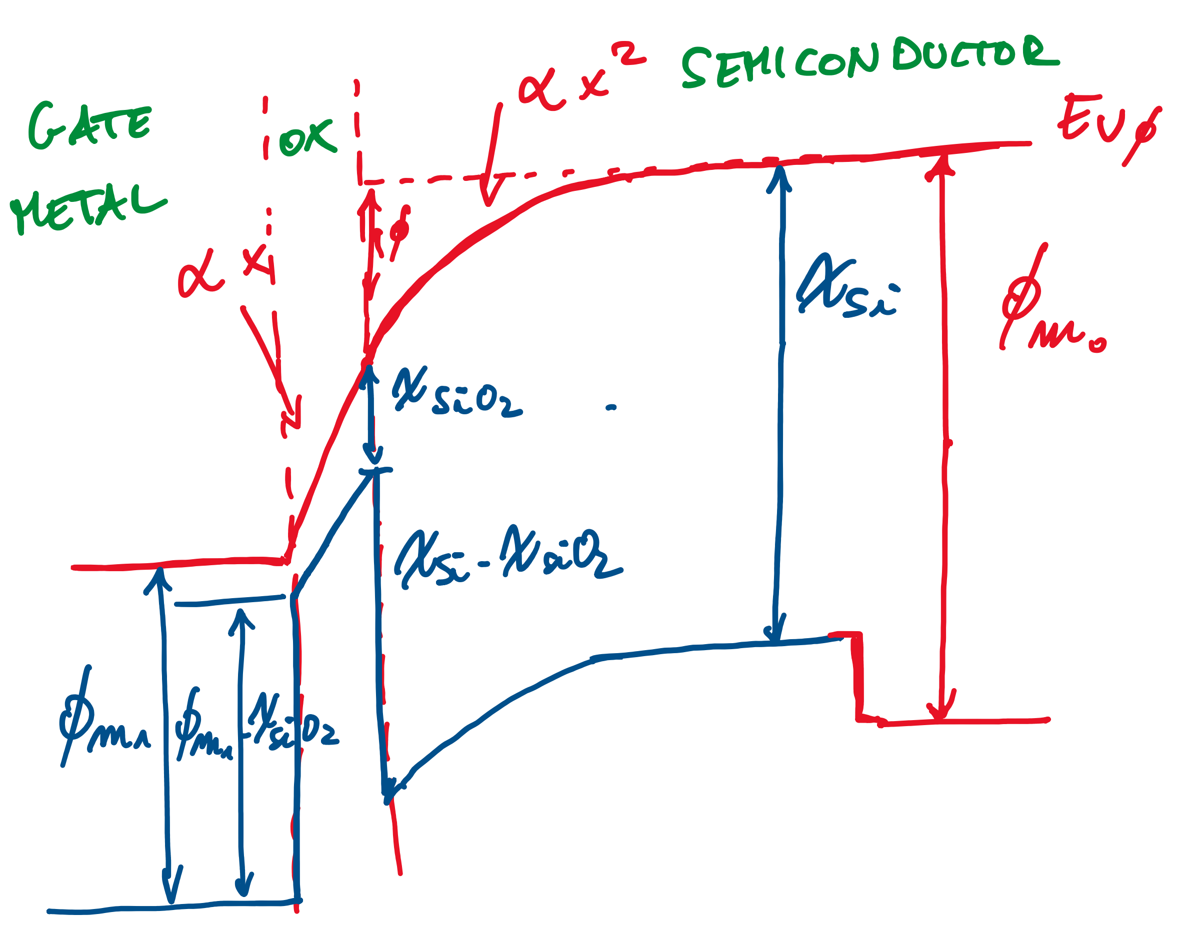
OX $$\varepsilon\frac{\partial^2\phi}{\partial x^2} = 0 \longrightarrow \varepsilon\frac{\partial\phi}{\partial x} = C$$

$$\phi = Cx + D$$

Z.S. $$\varepsilon\frac{\partial^2\phi}{\partial x^2} = qN_A^-$$

$$\phi(x) = Cx^2 + Dx + E$$

$$BC(\vec r) = EV(\vec r) - q\phi(\vec r) - \chi(\vec r)$$



$$\nabla\cdot(\varepsilon\nabla\phi) = -q\rho(\phi)$$

ϕ_0 TRIAL $\rightarrow \rho(\phi_0)$

$$\boxed{\nabla\cdot(\varepsilon\nabla\phi_1) = -q\rho(\phi_0)}$$

$\downarrow \phi_1$

$\rho(\phi_1)$

$$\nabla\cdot(\varepsilon\nabla\phi_2) = -q\rho(\phi_1)$$