

# Working Principle of a Semiconductor Based Solar Cell

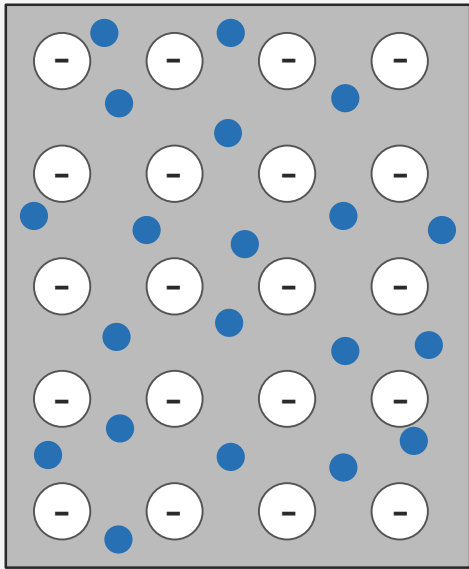
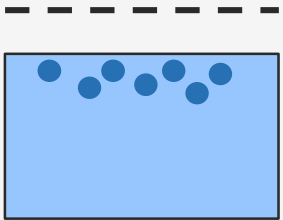
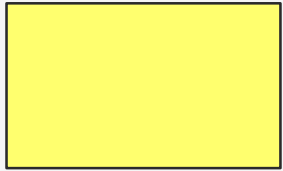
## Semiconductor Junction I - Basic Principles

*Week 2.4.1*

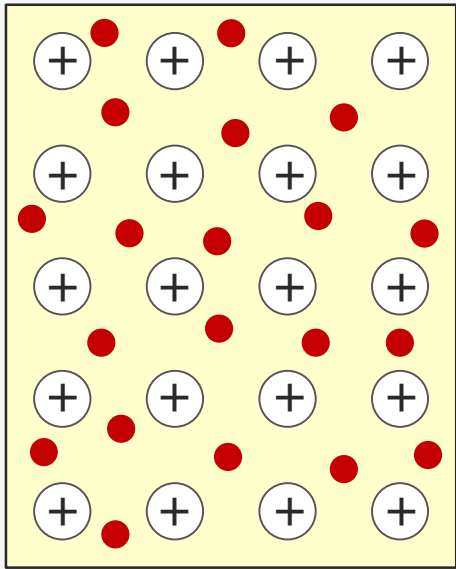
Arno Smets

# Semiconductor Junction

Band diagram

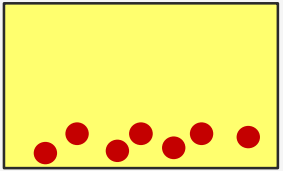


p region

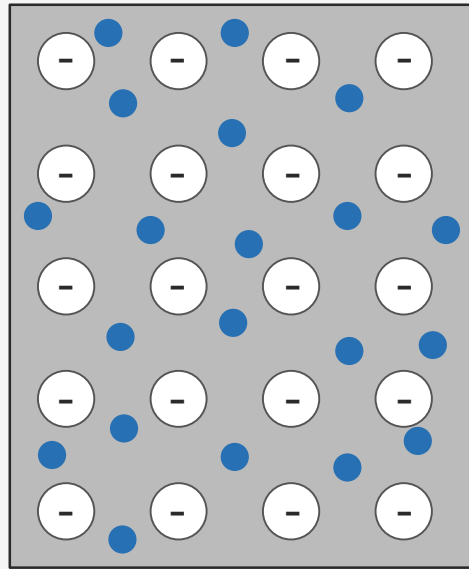


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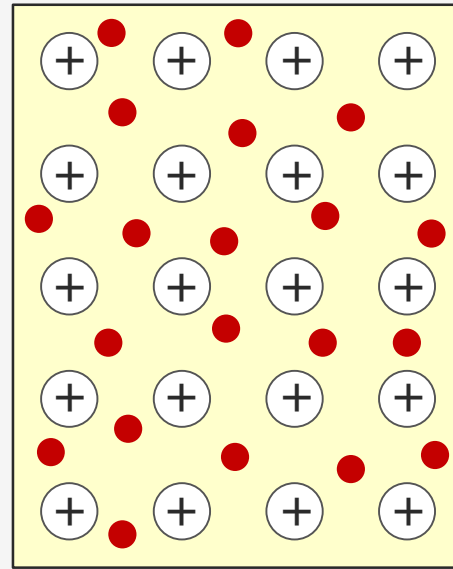
Band diagram



# Semiconductor Junction

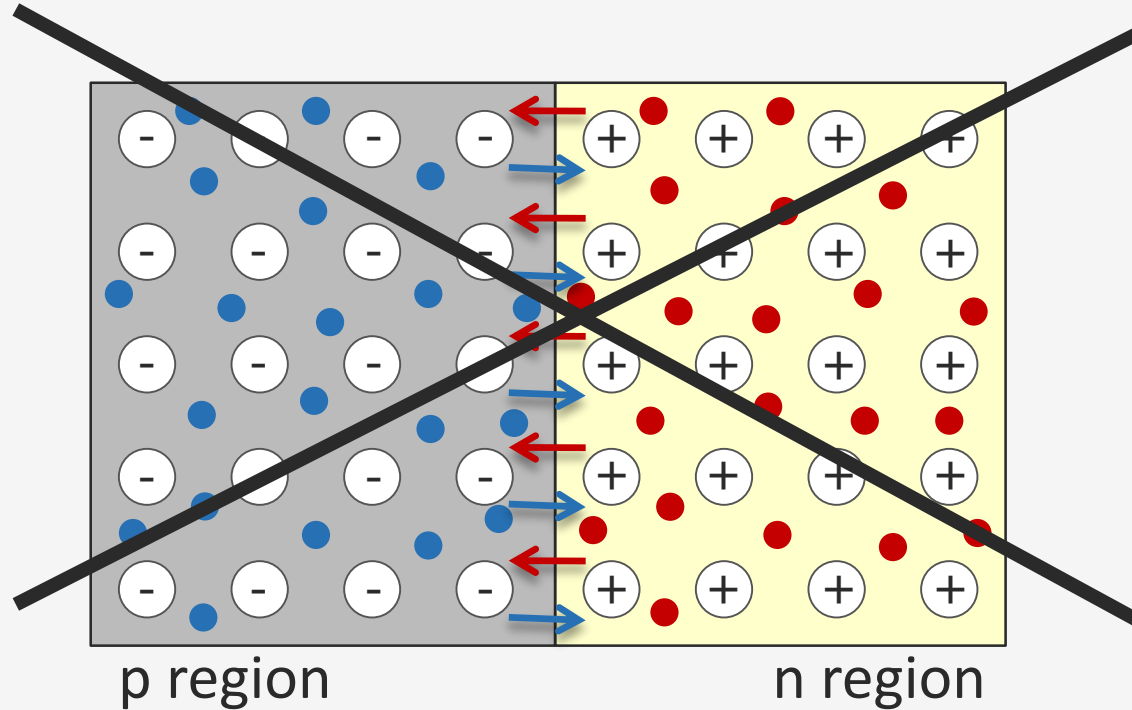


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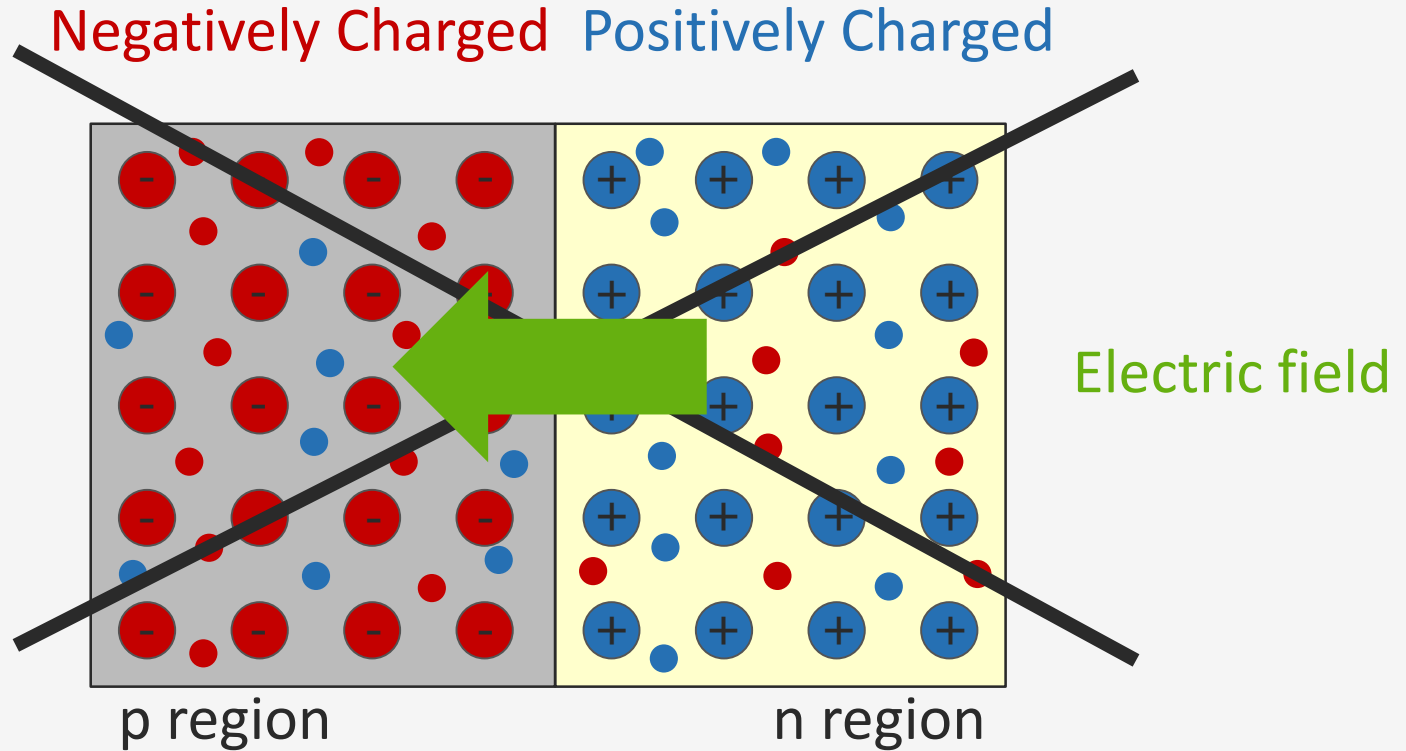


n region

# Semiconductor Junction

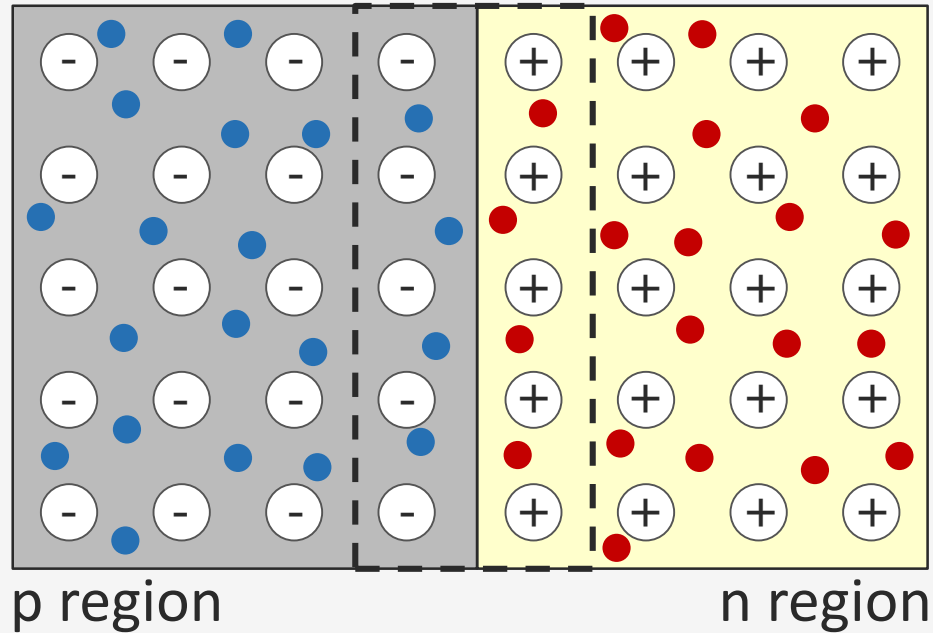


# Semiconductor Junction

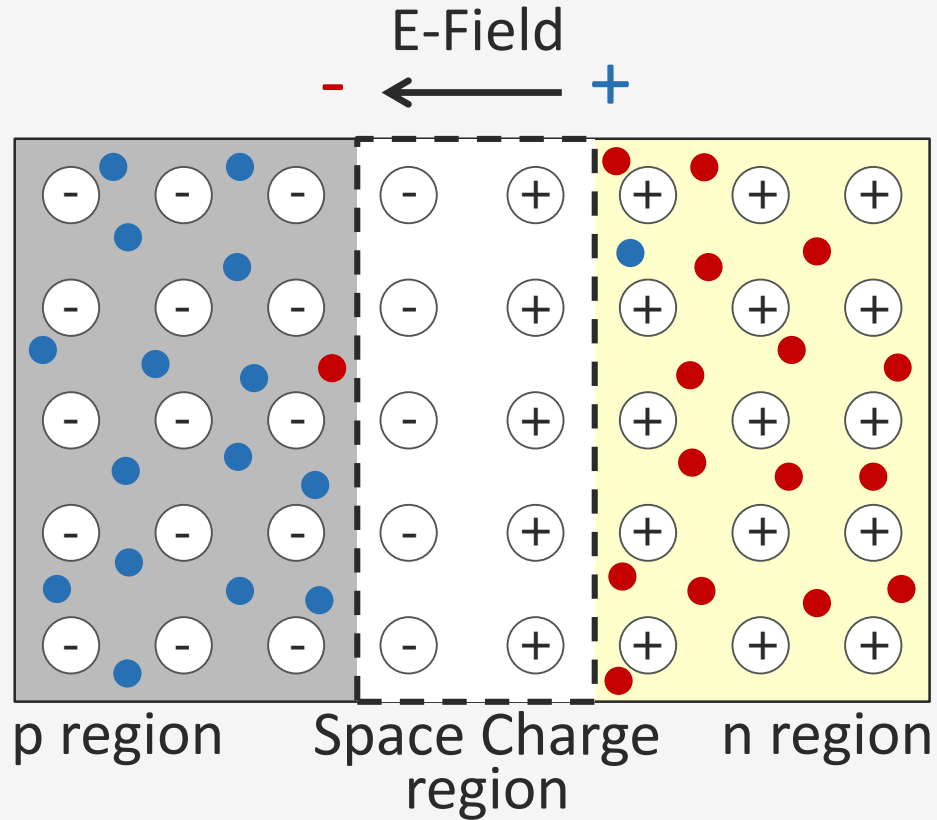


# Semiconductor Junction

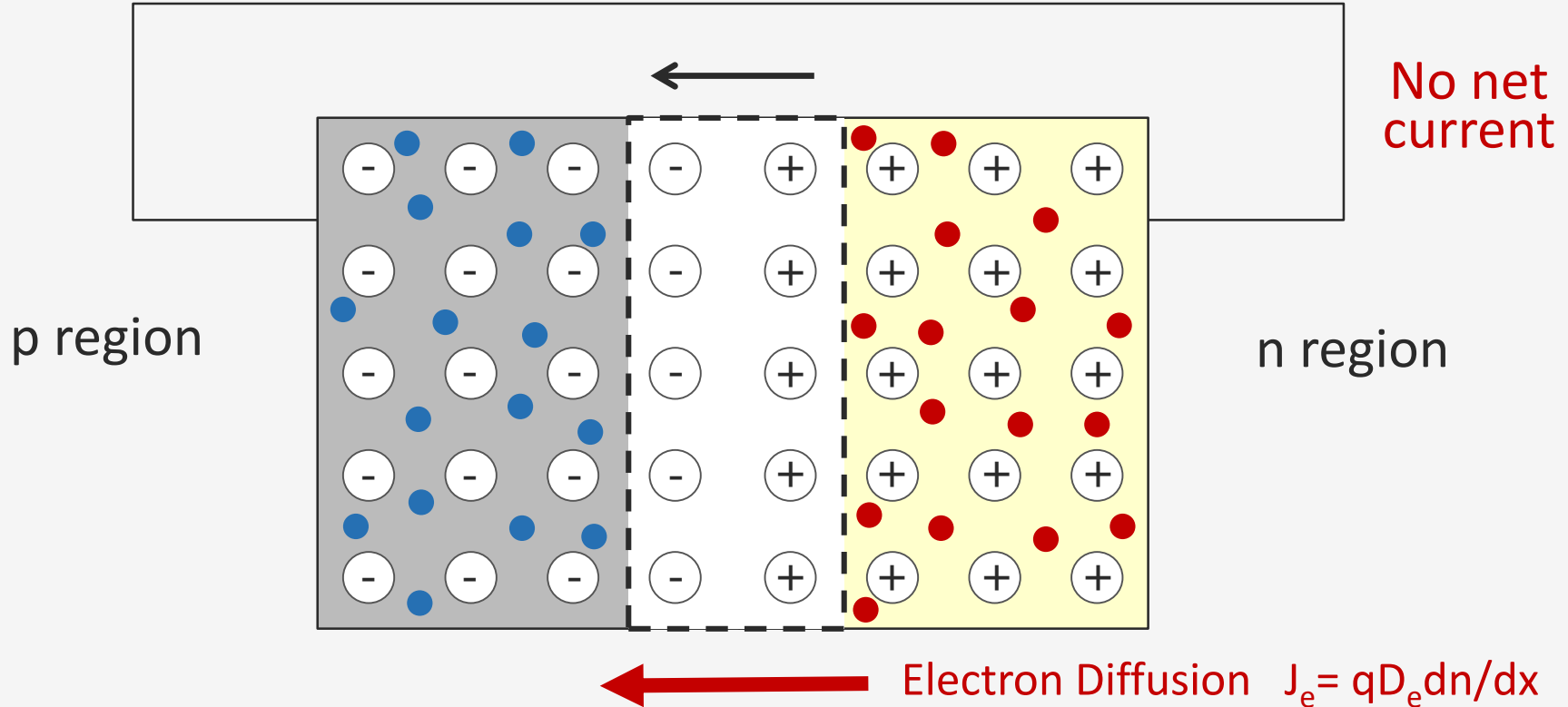
*Diffusion of holes and electrons close to the junction*



# Semiconductor Junction

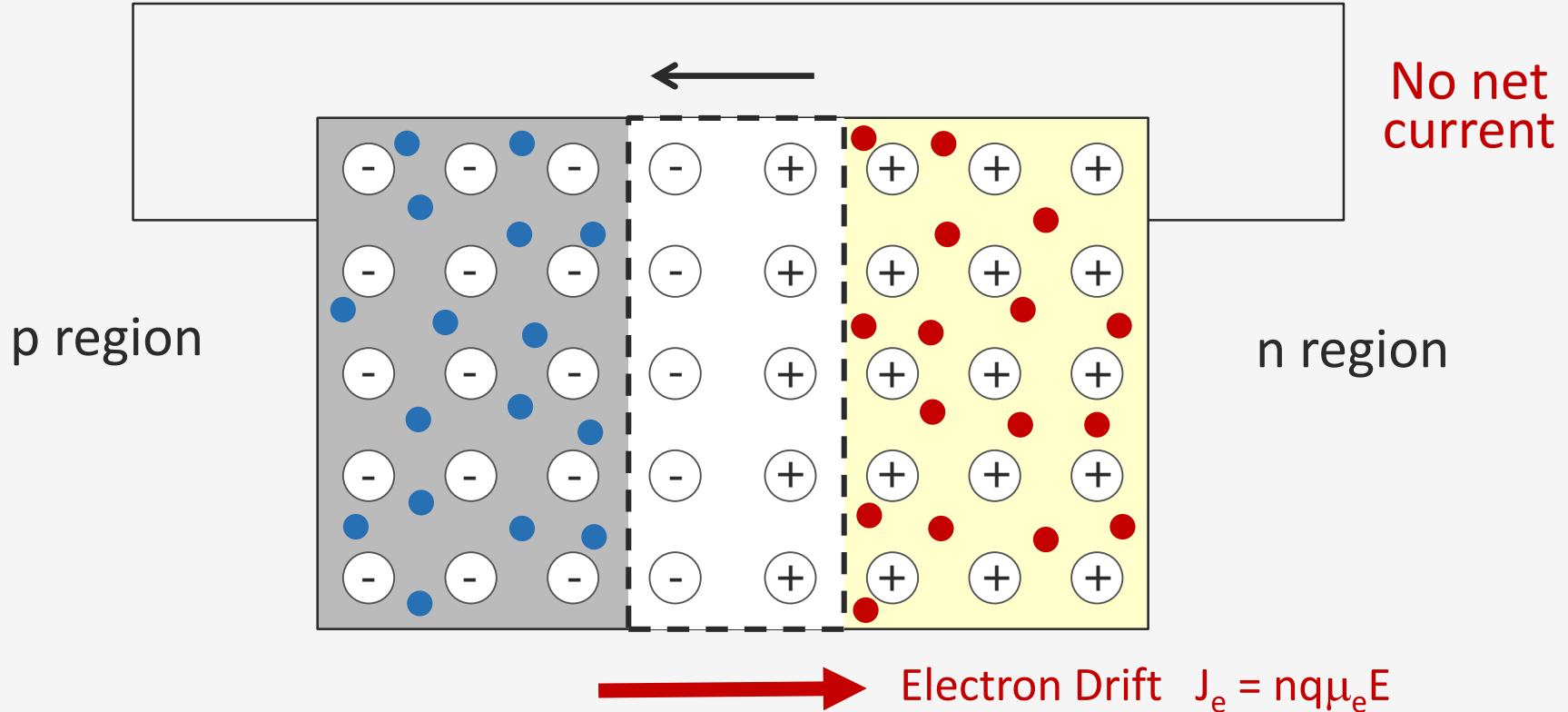


# Semiconductor Junction – Thermal Equilibrium

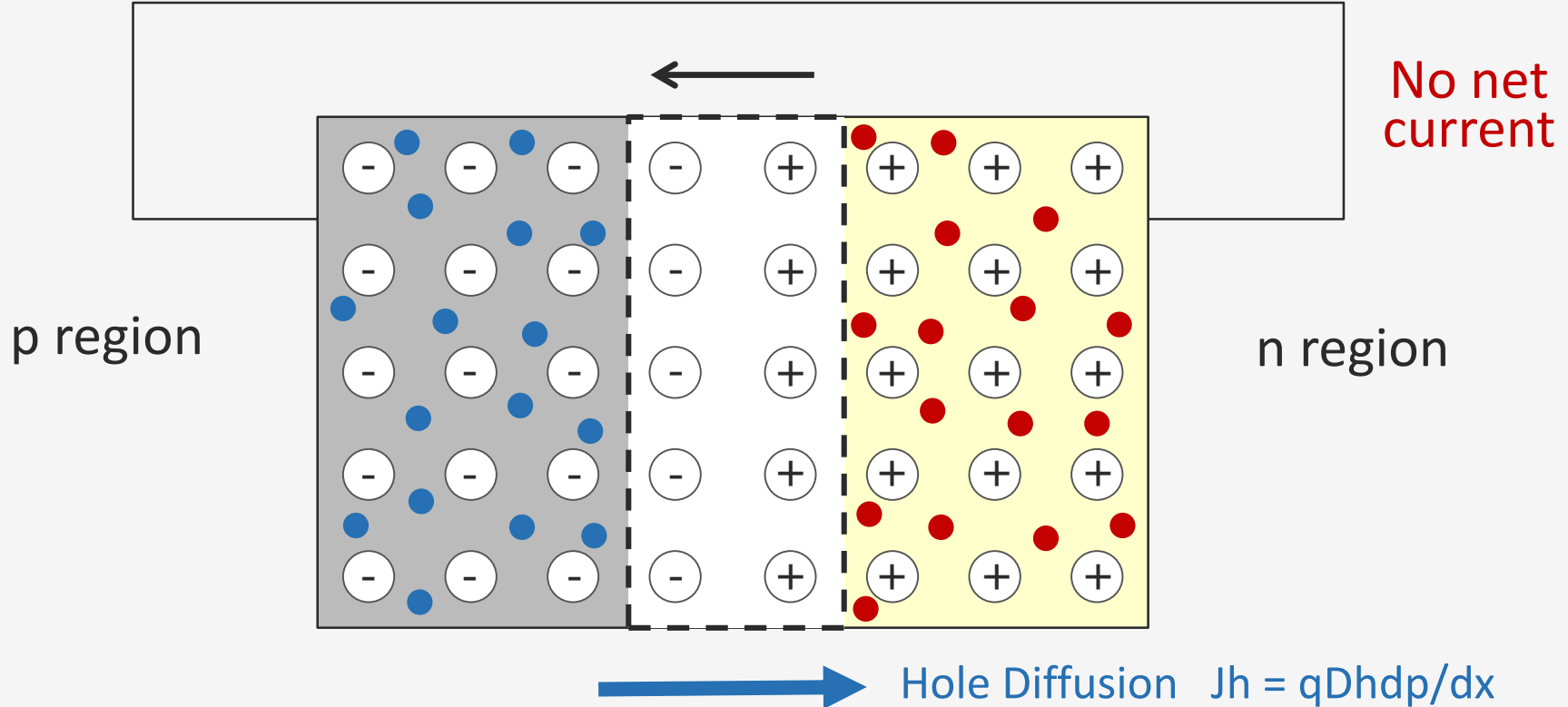




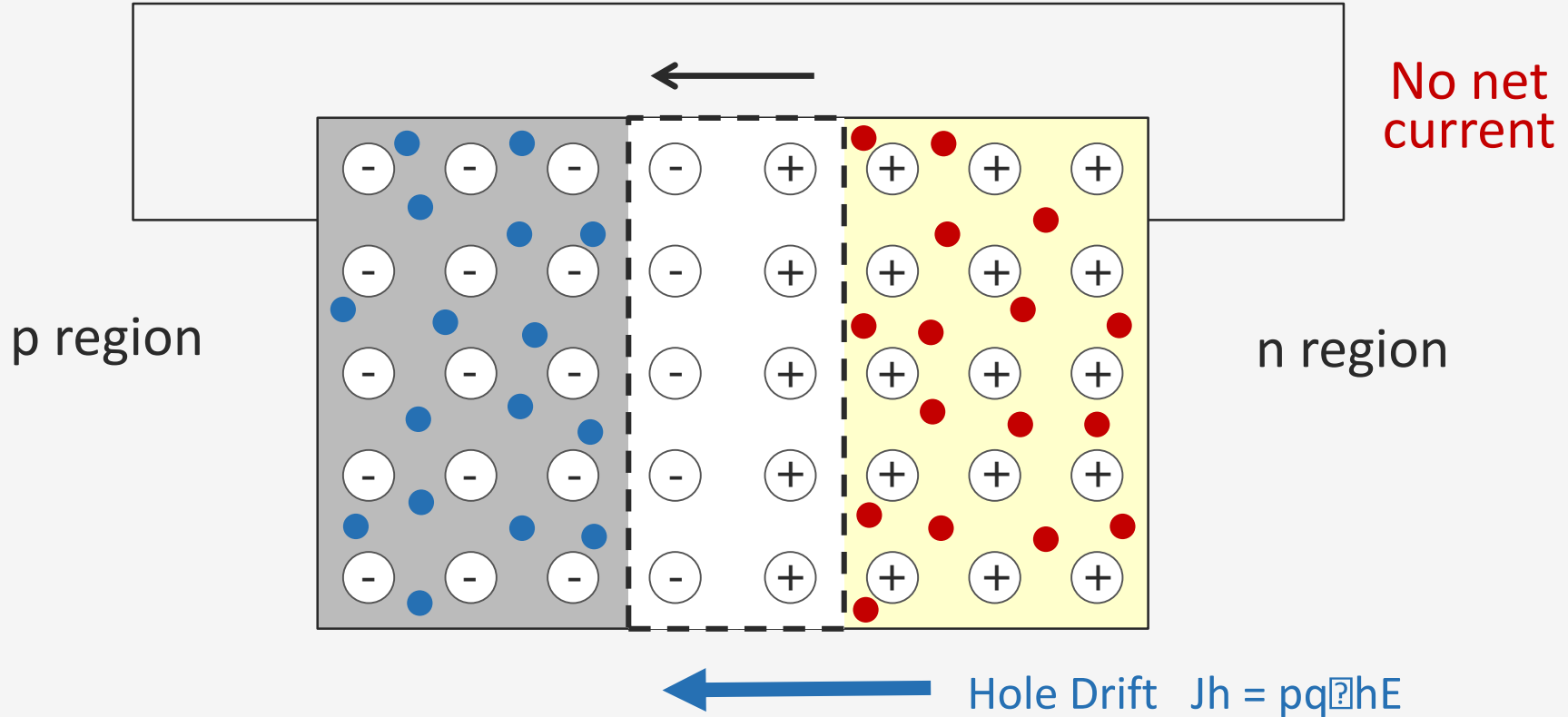
# Semiconductor Junction – Thermal Equilibrium



# Semiconductor Junction – Thermal Equilibrium

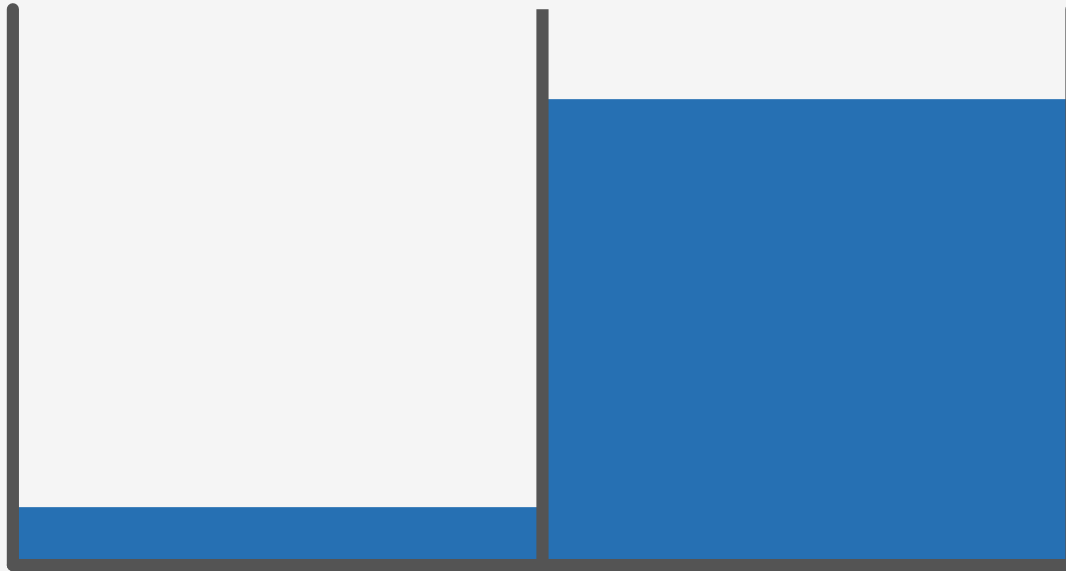


# Semiconductor Junction – Thermal Equilibrium

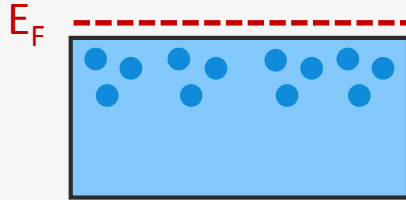
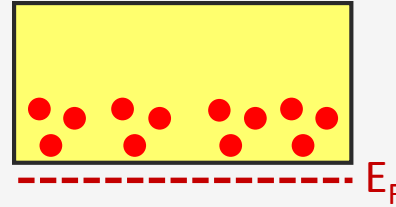


# Semiconductor Junction – Thermal Equilibrium

Potential energy of water level  $\sim$  Fermi level



# Semiconductor Junction – Band diagram

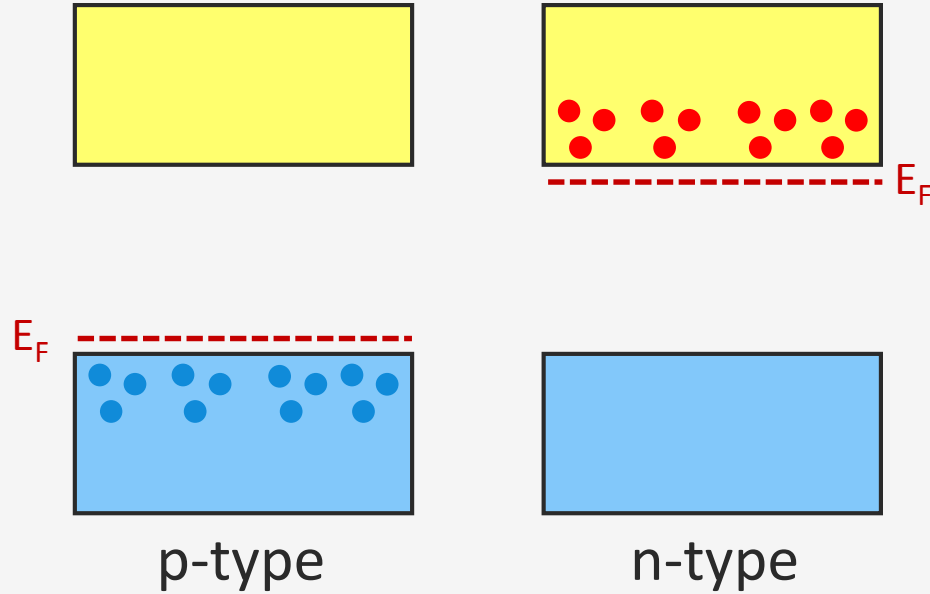


p-type

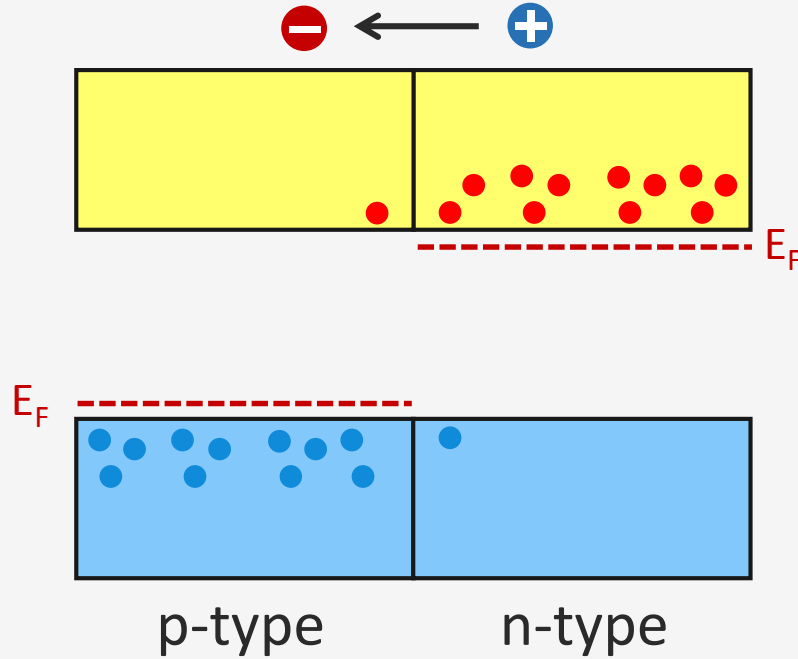


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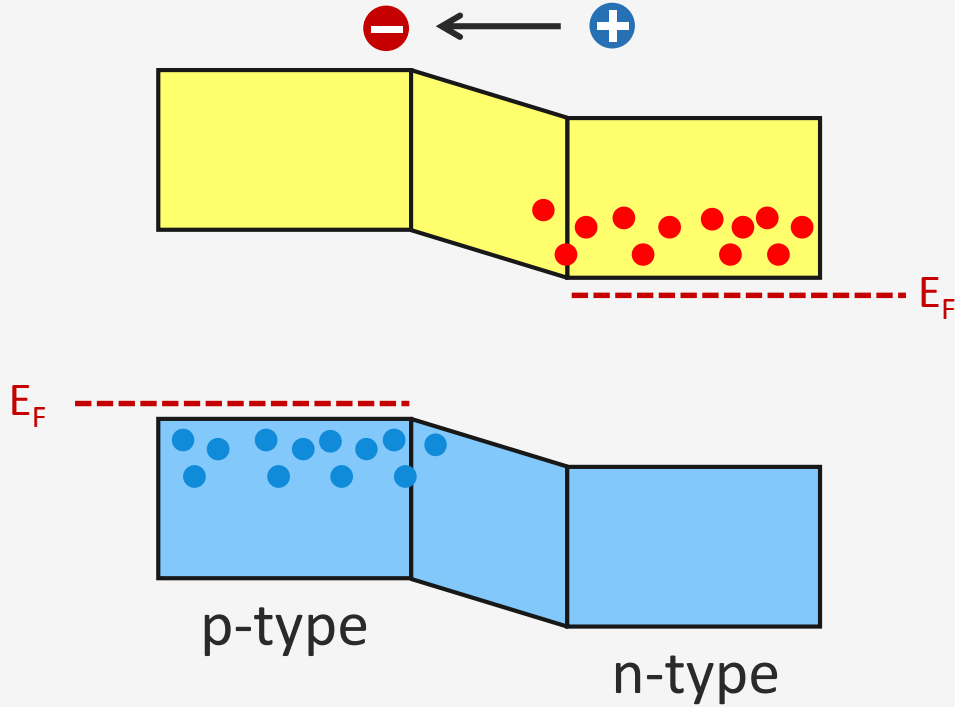
# Semiconductor Junction – Band diagram



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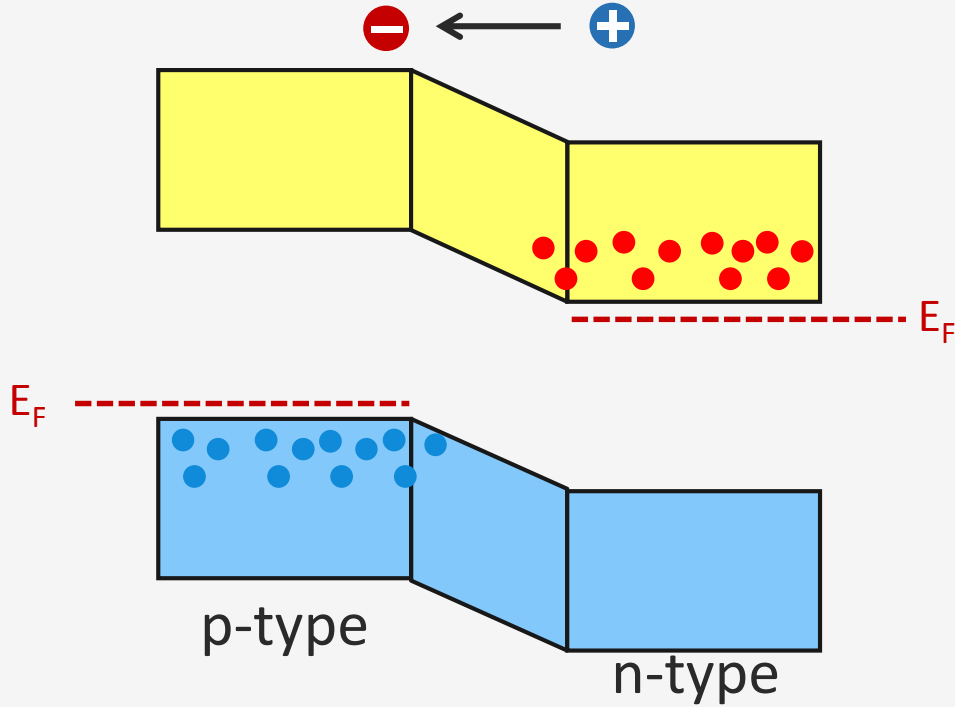


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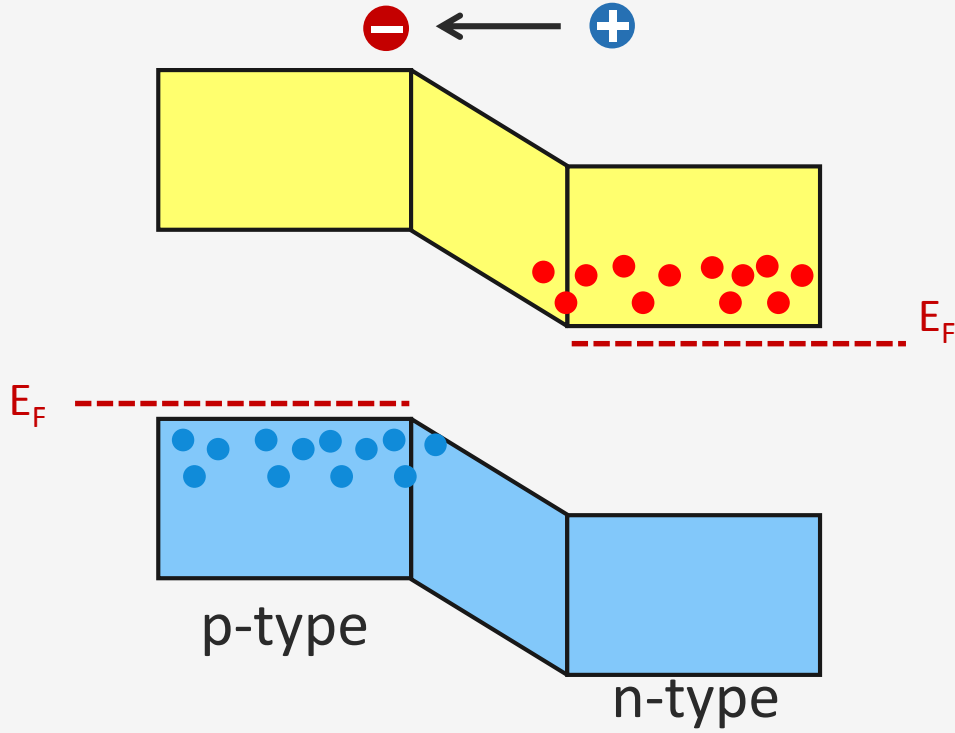




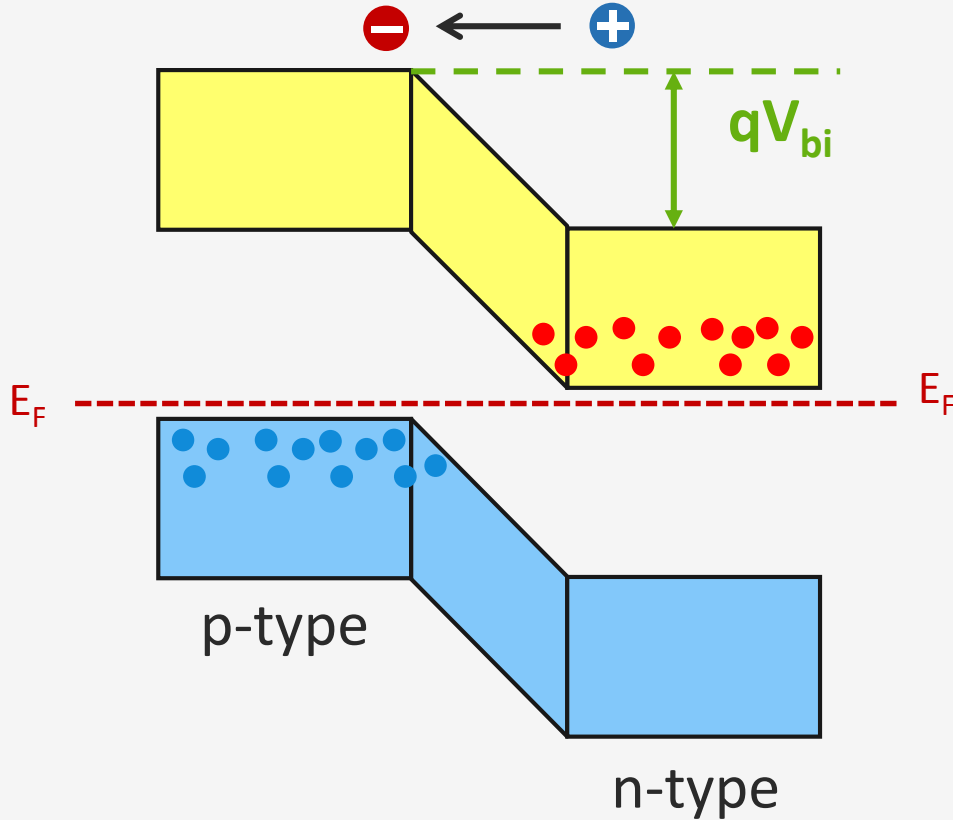
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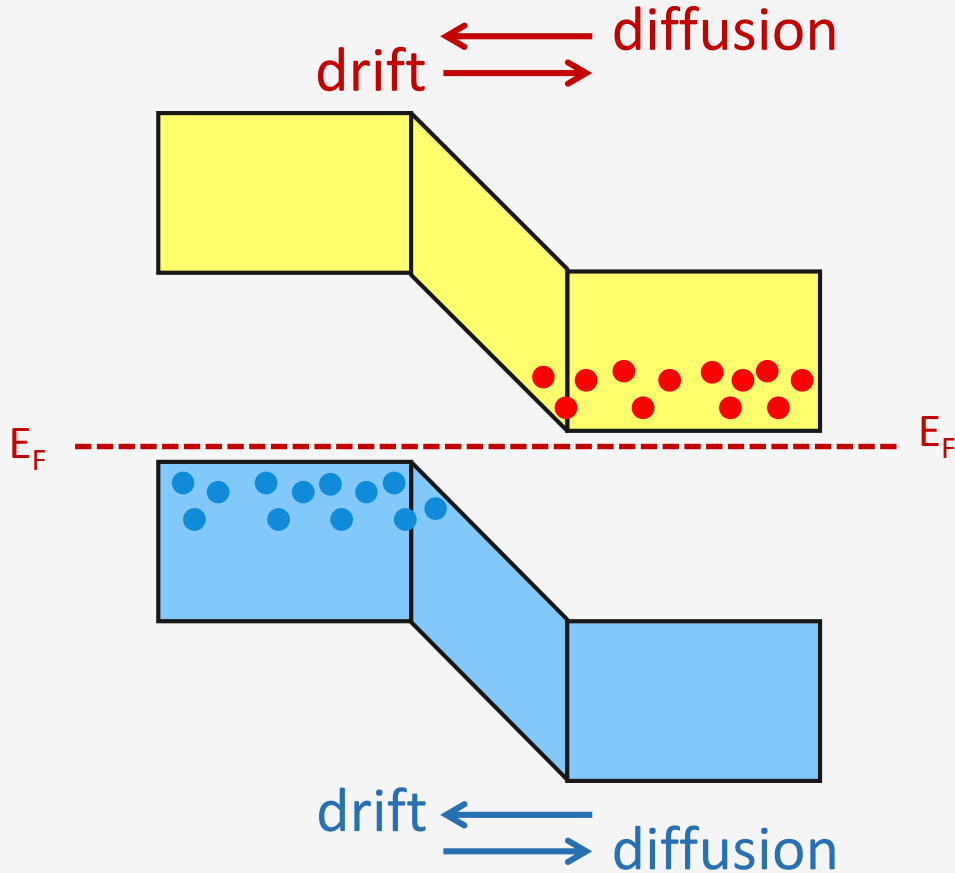
# Semiconductor Junction – Band diagram



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# Semiconductor Junction – Band diagram



**Thank you for your attention!**