

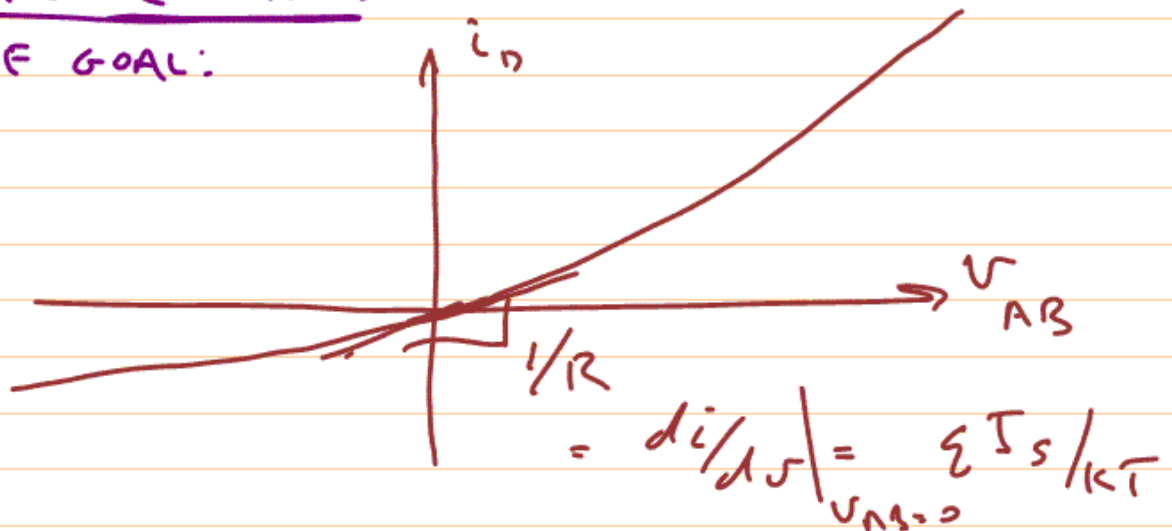
10 FEB. 2003

Note Title

2/10/2003

OHMIC CONTACTS

THE GOAL:



∴ LARGE $I_S \Rightarrow$ SMALL R

TO GET LARGE I_S

1. CHOOSE METAL WITH LOW ϕ_m
2. HEAVILY DOPED SEMICONDUCTOR

a. ~~⇒~~ THIN DEPLETION REGION

⇒ NARROW BARRIER

⇒ SIGNIFICANT TUNNELING

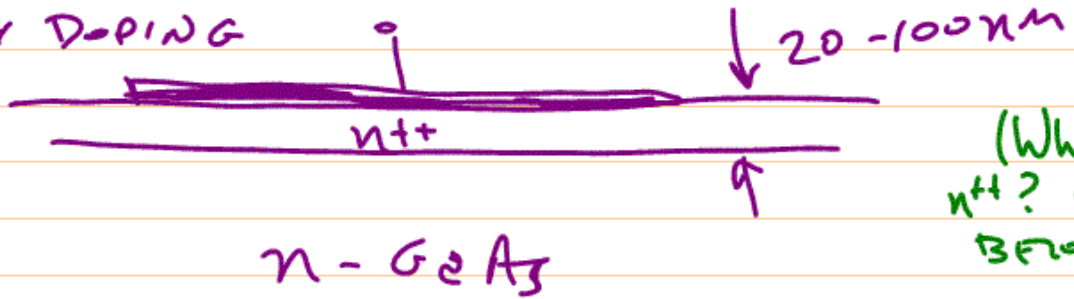
b. ~~⇒~~ HIGH FIELD @ SURFACE

⇒ SIGNIFICANT IMAGE FORCE LOWERING

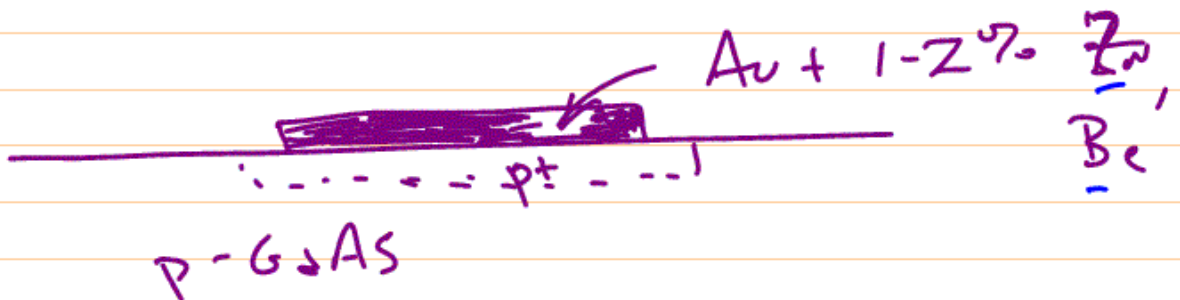
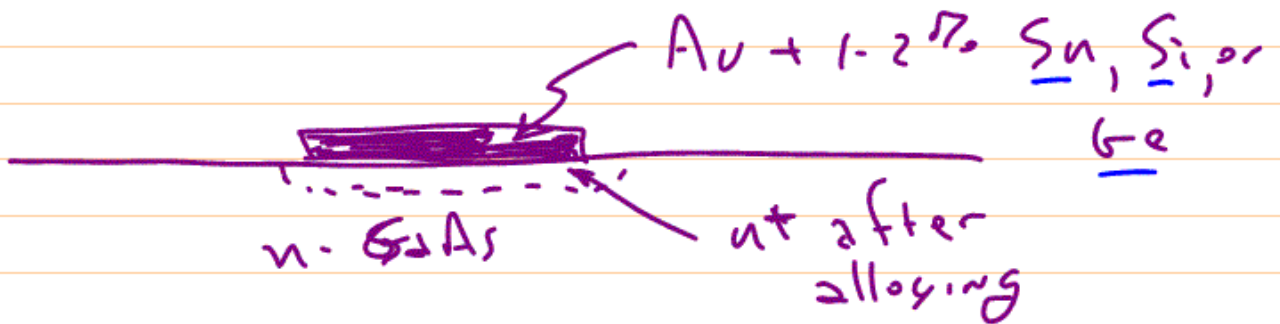
c. ~~⇒~~ MORE CARRIERS → BARRIER GETS HIGHER
SO NO MARGINAL IMPACT

OHMIC CONTACT PRACTICE - how to

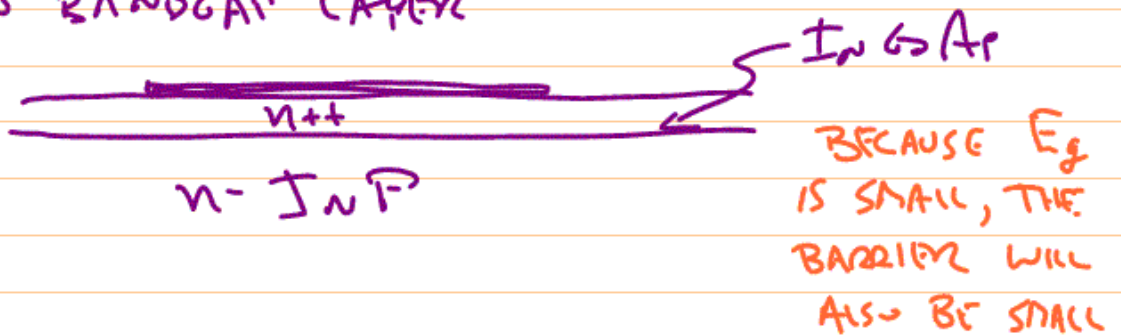
A. HEAVY DOPING



(What is n^{++} ? SEE BELOW.)



B. NARROW BANDGAP LAYER



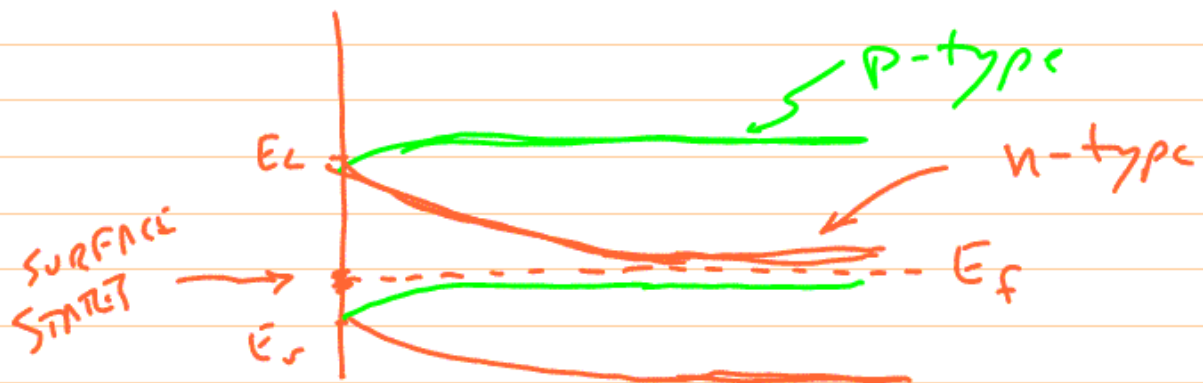
* NOTE ON NOTATION:

n^{++} n^+ n V i π p p^+ p^{++}
 heavy n \rightarrow light n \rightarrow intrinsic \rightarrow light p \rightarrow heavy p

FINAL M-S JUNCTION POINT FOR TODAY

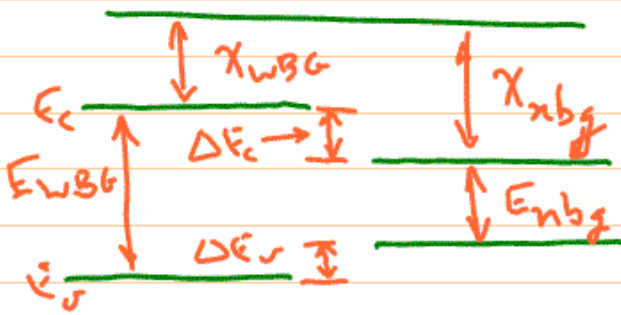
Schottky barriers on n vs p

In general: easy ↗ hard ↗

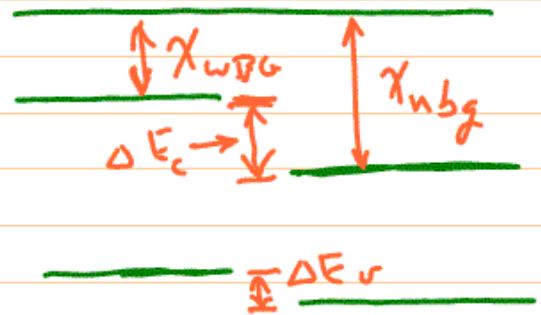


- ★ IF SURFACE IS PINNED NEARER V.B., AS IT typically is, then the barrier on p-type will be small, and the rectification will be weak.

HJ TYPES - BAND LINE-UPS



Type I



Type II

TYPE I: $\chi_{nbg} > \chi_{WBG}$, $\chi_{nbg} + E_{nbg} < \chi_{WBG} + E_{WBG}$

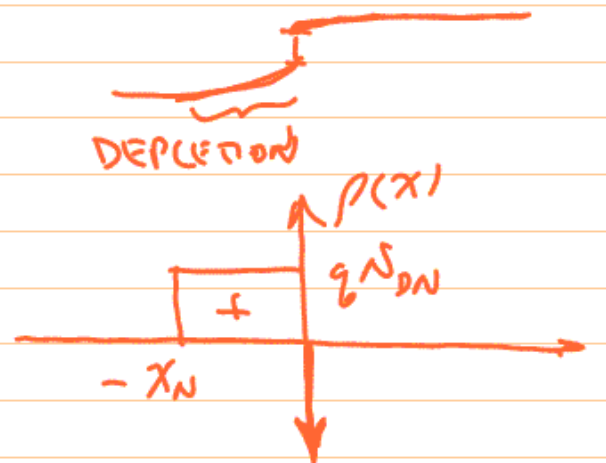
TYPE II: " > " " > "
OR " < " " < "

ISOTYPE EXAMPLE: N-n



N

n



NEXT TIME: CURRENT FLOW ACROSS AND ALONG HJ's