Series – Semiconductor physics and light-matter interaction

Academic year 2024-2025 – 1st semester

Samuele Brunetta, samuele.brunetta@epfl.ch, CH A3 495

EXTRA Series – *Graph interpretation*

The aim of this series is to analyse and comment on the following figures (subfigures complete each other) using the physical concepts seen in the lectures and the previous series throughout this semester. You should first focus on the main aspects and whenever possible you should then go more deeply into the details of the underlying physics (i.e., describe what seems especially relevant to you as extensively as possible).

Exercise

Figure I

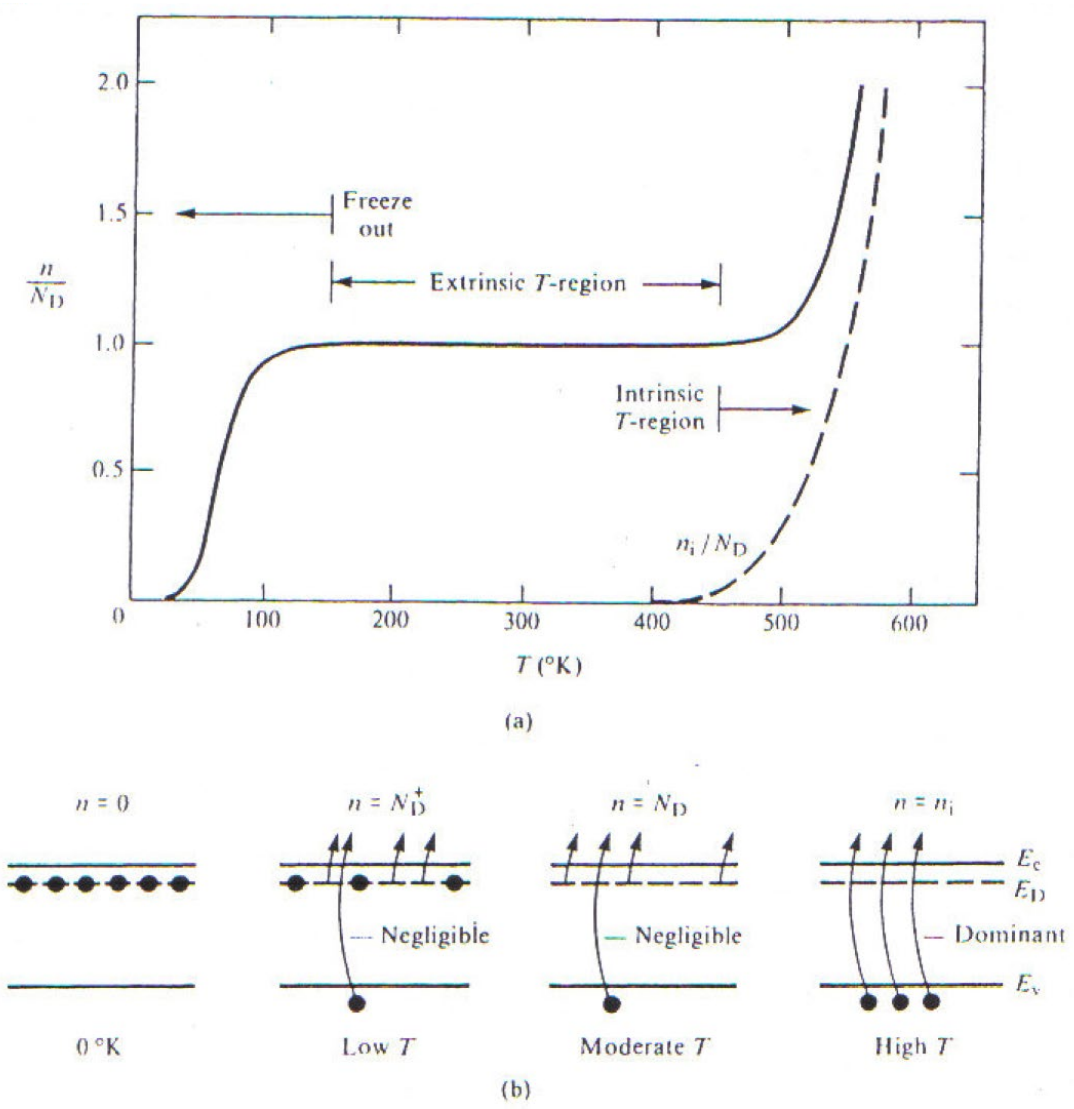

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Figure II

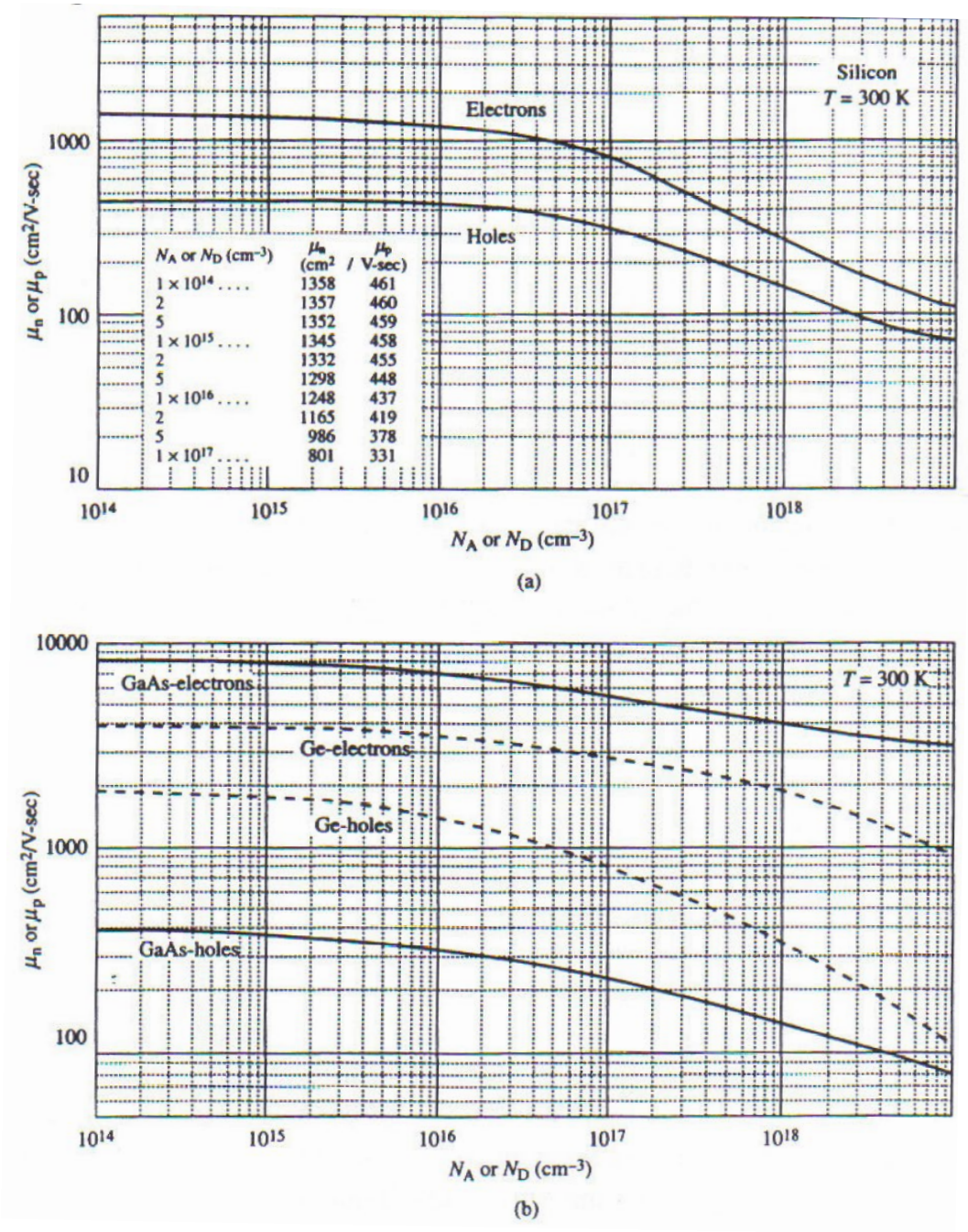

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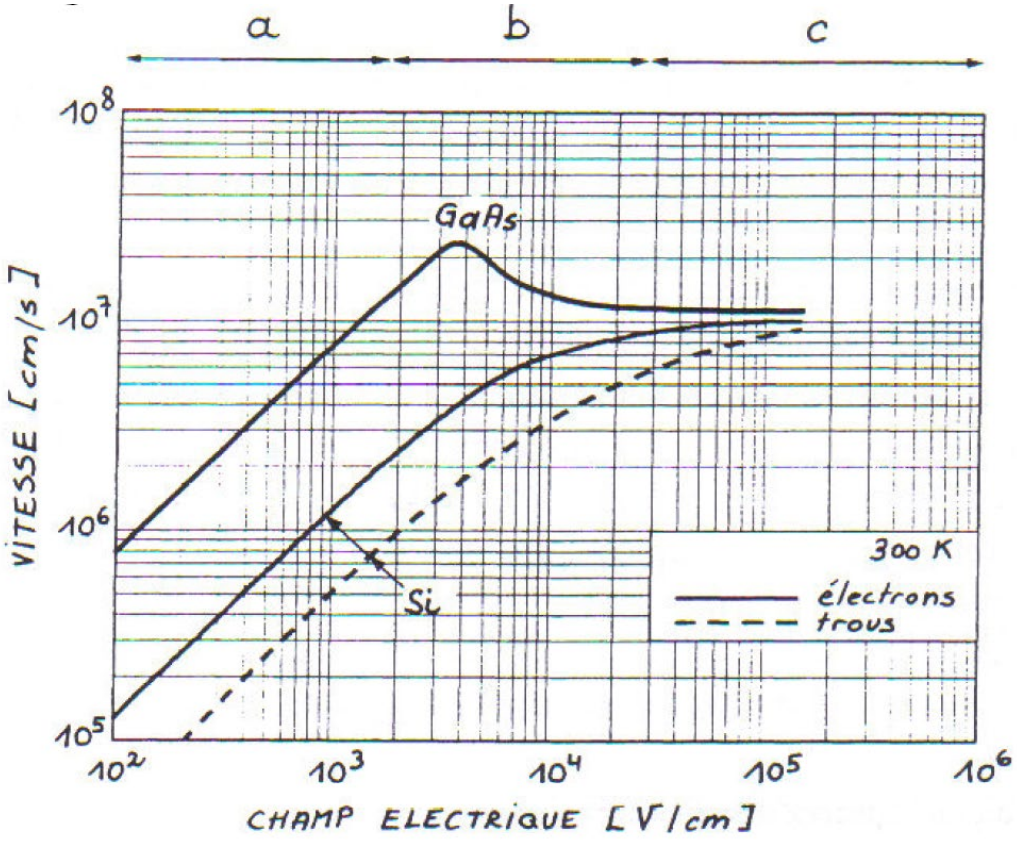
Figure III

(a)



(b) GaAs band structure

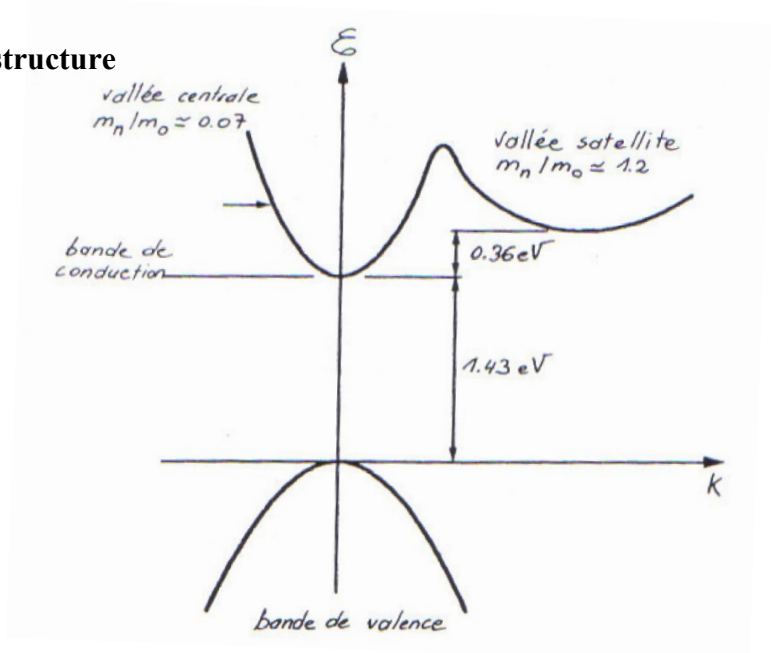


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Figure IV
Schematic current-voltage characteristics of a forward biased p-n junction diode

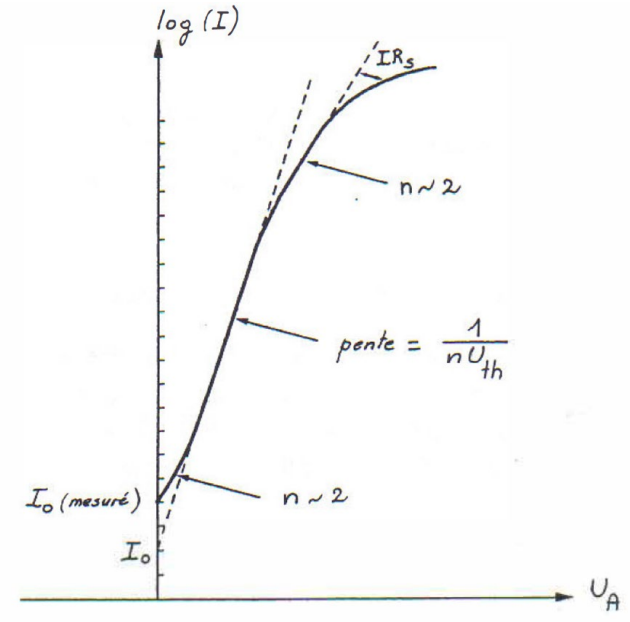
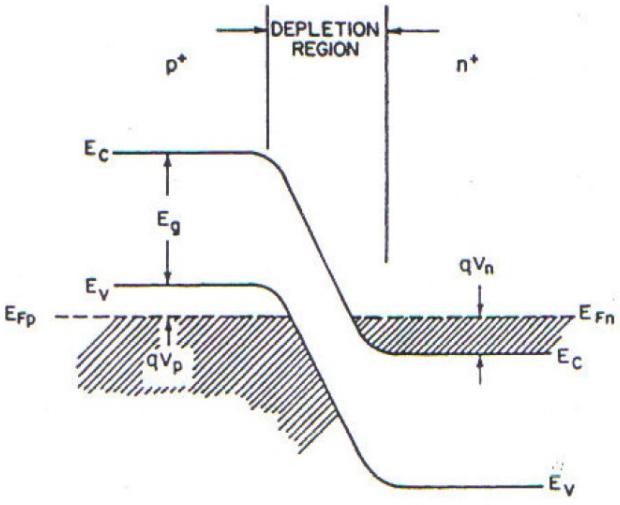
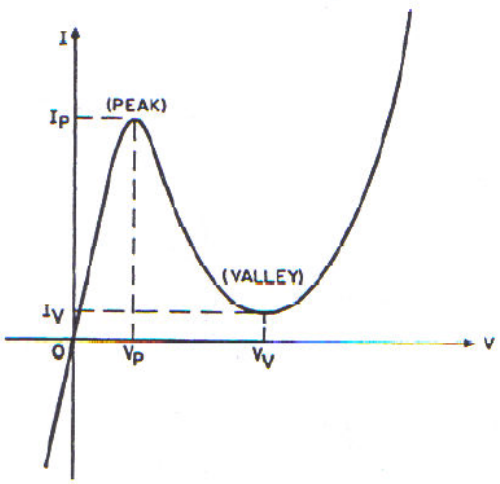


Figure V
(a) Band diagram of a tunneldiode at thermal equilibrium. *Vn* and *Vp* correspond to the degeneracy level for the n- and p- type regions, respectively. (b) I-V curve of a tunneldiode and (c) schematic explaining the evolution of the I-V curve.

(a)



(b)



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(c)