

Why Feynman does not discuss the electrical conductivity of metals?

P. R. Silva – Retired Associate Professor - Departamento de Física - ICEX - Universidade Federal de Minas Gerais (UFMG). email-prsilvafis@gmail.com

Abstract – I was surprised by the fact that, Drude’s formula for the electrical conductivity of metals, does not appear in the famous textbook: “The Feynman Lectures on Physics”.

Electrical conductivity of metals is usually discussed in undergraduate general physics textbooks [1 to 3] and also in introductory solid state physics textbooks (see for instance C. Kittel [4]). One of the achievements of these treatments is the “deduction” of the Paul Drude’s formula for the electrical conductivity of metals, which is stated as a function of the number of charge carriers per unit of volume, the quantum of elementary electric charge, the mass of the charge carriers, and the averaged time between collisions. However looking at the nicely famous textbook:”The Feynman Lectures on Physics”, I do not found any mention to the Drude formula for the electrical conductivity.

Unfortunately it is not possible to ask Feynman himself why this topic is missing in his outstanding book. May be he does not found (from his point of view) any satisfactory elementary explanation of this subject, or even to be not worth to talk about it in the text.

I would like to get the opinion of my colleagues about this fact.

References

- [1] D. Halliday, R. Resnick, Fundamentals of Physics, 3^d edition, Wiley, 1988.
- [2] S. Borowitz, A. Beiser, Essentials of Physics, Addison-Wesley, 1966.
- [3] Alaor Chaves, *Física Básica - Eletromagnetismo* (Editora LAB, Rio de Janeiro, 2007), cap. 10.
- [4] C. Kittel, Introduction to Solid State Physics, 5th edition , Wiley, 1976 - Ch. 6