Calculating the Magnetoresistance Effect in Metals

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Transversal magnetoresistance is calculated for numerous metal cases on the basis of simple electron theory. Any metal can be represented by a single band of states having a closed Fermi surface which is assumed to be similar in shape to a sphere. In an external electromagnetic field the electron transport seems to be regulated by two kinds of relaxation times. The first one is due to the electric field, and its size is not appreciably influenced by that field. On the other hand, electron motion in the magnetic field is associated with a relaxation time that is strongly dependent on the strength of that field. Both time parameters combine to an effective relaxation time according to Matthiessen's rule. A good agreement between experiment and theory is obtained for Li, Cu, Ag, Au and Pd, Pt metals.

Key words: Metals; Magnetoresistance Effect; Relaxation Time.