

MAR07-2006-000218

Abstract for an Invited Paper  
for the MAR07 Meeting of  
the American Physical Society

**Quantum Linear Magnetoresistance: Solution of an Old Mystery**

A.A. ABRIKOSOV, Argonne National Laboratory

In the paper the history of the discovery of the linear magnetoresistance in metals by P. L. Kapitza in 1928 - 1929 and its explanations are presented. Actually, Kapitza discovered two different phenomena. One of them – the linear magnetoresistance at classically large magnetic fields in polycrystalline samples of metals, having open Fermi surfaces, was explained by I. Lifshits and V. Peschansky in 1958. The other phenomenon is the quantum linear magnetoresistance, appearing in metals, or semimetals, with a small concentration of carriers and a small effective mass, when only the lowest Landau band participates in the conductivity. Manifestations of this unusual phenomenon in different materials are described.