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Anisotropy of the resistivity and thermoelectric power in cubic ferromagnets U_3P_4 and U_3As_4 *

Piotr Wiśniewski
Institute of Low Temperature and Structure Research, PAS, Wrocław, Poland

Strong anisotropy of electrical resistivity exceeding 50% was observed in single-crytal samples of ferromagnetic U_3As_4 and U_3P_4 for data taken at different angles of external magnetic field. Unusual reversal of this anisotropy was discovered in both compounds when the temperature was decreased to about 55K and 100K, respectively.
Even more striking is the analogous anisotropy of thermoelectric power which for U_3P_4 exceeds 100% at temperatures between 25K and 55K.
We stress that it is only the application of weak magnetic field in a specific direction that causes such a huge change of thermoelectric power.
Previous electron-band calculations and de Haas-van Alphen measurements provide a possible explanation of electron-transport anisotropy within a two-current model of electrical conductivity taking into account 5f-bands with cyclotron masses reaching 70 and $33m_0$ for U_3As_4 and U_3P_4, respectively. However, both the huge value of anisotropy and the reversal of its sign, seem to demand for an additional cause in compounds studied here.
We suggest that it is the rhomboedral distorsion of cubic lattice, seen directly through a magnetostriction of order of 10^{-3}, which induces an anisotropy of Fermi surfaces, and thus plays a leading role in the appearance of such unusual anisotropy in the electron-transport phenomena.

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