

HIGH-PRESSURE MAGNETOTRANSPORT MEASUREMENTS OF THE SEMIMETALLIC FERROMAGNET EuB_6

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Hall effect measurements on EuB_6 have revealed manifestations of the microscopic electronic phase separation and resulting percolative phase transition in a macroscopic magnetotransport property of this semimetallic ferromagnet [1]: the Hall resistivity as a function of applied field in the paramagnetic phase exhibits two distinct linear regions with a transition point at a single critical magnetization in a broad temperature range, which was interpreted as the percolation point for the more conducting phase. To further understand this phenomenon, magnetotransport measurements were performed on EuB_6 under high pressure. Hydrostatic pressure is known to substantially modify the magnetic state of EuB_6 [2]. EuB_6 single crystals were inserted in a high-pressure cell filled with silicone oil and measurements were taken at different pressures up to 1.8 GPa. Increasing hydrostatic pressure caused a decrease in resistivity and an increase in T_θ , while the ferromagnetic ordering temperature stayed approximately constant. The Hall resistivity in the paramagnetic phase developed an intermediate region between the two previously observed regions.

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[1] X. H. Zhang et al, Phys. Rev. Lett. 103, 106602 (2009).

[2] J.C. Cooley et al, Phys. Rev. B 56, 14541 (1997).

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