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High-pressure magnetotransport measurements of the semimetallic ferromagnet EuB_6[1] DANIELLE SIMMONS, LIUQI YU, STEPHAN VON MOLNAR, PENG XIONG, Florida State University, JUN ZHU, CONG REN, Institute of Physics, Chinese Academy of Sciences, ZACHARY FISK, University of California, Irvine — 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. The transition fields between the low-field and intermediate regions depend linearly on temperature and their intercepts increase with pressure similar to the variation of T_θ indicated by the resistivity peak.

[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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