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Celestijnenlaan 200D, room 05.34

Diamagnetic (Condon) domains in silver and beryllium

Dr. Roman Kramer

Grenoble High Magnetic Field Laboratory

Condon domains arise in high quality single crystals of normal metals like silver and beryllium at low temperatures and quantizing magnetic fields. The periodically arising Condon domain structure is locally detected at the surface of a silver sample using an array of micro Hall probes. The induction difference $\pm B$ between the para- and diamagnetic domain phases is about 1 mT at 10 T. The size, orientation, and the domain wall thickness are estimated by analyzing Hall probes placed along and across the long sample axis. On a beryllium sample only a surprisingly low induction difference is found at the surface.

Furthermore, I will show that hysteresis arises in the de Haas-van Alphen effect under the conditions of the Condon domain state. The small hysteresis loop, about 0.2 mT at 3.6 T, is identified using DC Hall probes and a standard AC modulation field technique. The detection of hysteresis with the AC technique offers a highly sensitive method by which phase diagrams of the Condon domain state are measured for silver and beryllium samples. The experimentally obtained phase diagrams are compared to recent theoretical predictions.