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Interplay between Fermi surface topology and ordering in URu_2Si_2 revealed through abrupt Hall coefficient changes YOON SEOK OH, KEE HOON KIM, Seoul National Univ., P. A. SHARMA, N. HARRISON, NHMFL, H. AMITSUKA, Hokkaido Univ., J. A. MYDOSH, Univ. of Cologne —
The Hall effect is becoming recognized as a viable alternative for understanding Fermi surface(FS) changes in f-electron antiferromagnets and ferromagnets tuned close to quantum criticality. Any knowledge of the extent to which the f- electrons contribute to the FS topology is of crucial importance for understanding the nature of the ordering and the fate of the heavy quasiparticles. We show that Hall effect measurements extended to high magnetic fields uncover an intricate level of interplay between the FS topology and the stability of the various phases of pure and 4 % Rh-doped URu_2Si_2. At low H and T, the enhancement of the Hall coefficient and Hall angle shows that the otherwise large FS is reconstructed into small high mobility pockets below T_o in URu_2Si_2: a finding that is ubiquitous among imperfectly-nested itinerant forms of broken translational symmetry groundstates. This groundstate is then destabilized when a magnetic field causes two of the high mobility pockets to become spin polarized, ultimately leading to its destruction at $\approx$ 35 T. Intermediate larger and strongly polarized FSs appear in phases II, III and V before a fully polarized unreconstructed FS is achieved beyond $\approx$ 39 T with 1 hole/U and 1.5 μ_B/U.

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