



Robust properties of the superconducting ferromagnet UCoGe

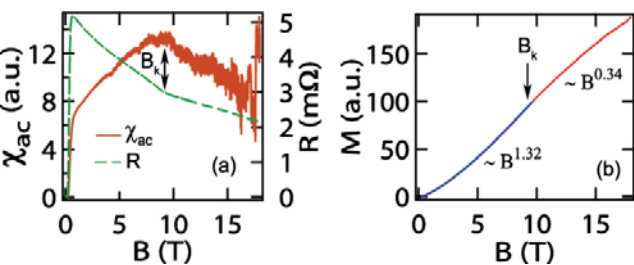
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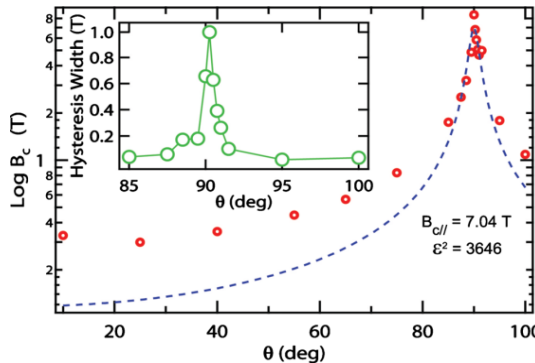


Current interest in uranium based superconducting ferromagnets has focused on the coexistence of SC and FM, including UGe₂, URhGe, UIr and UCoGe. In these materials SC develops below the ferromagnetic Curie temperature T_C without destroying magnetic order. There is evidence that unconventional SC is magnetically induced and involves spin-triplet pairing.

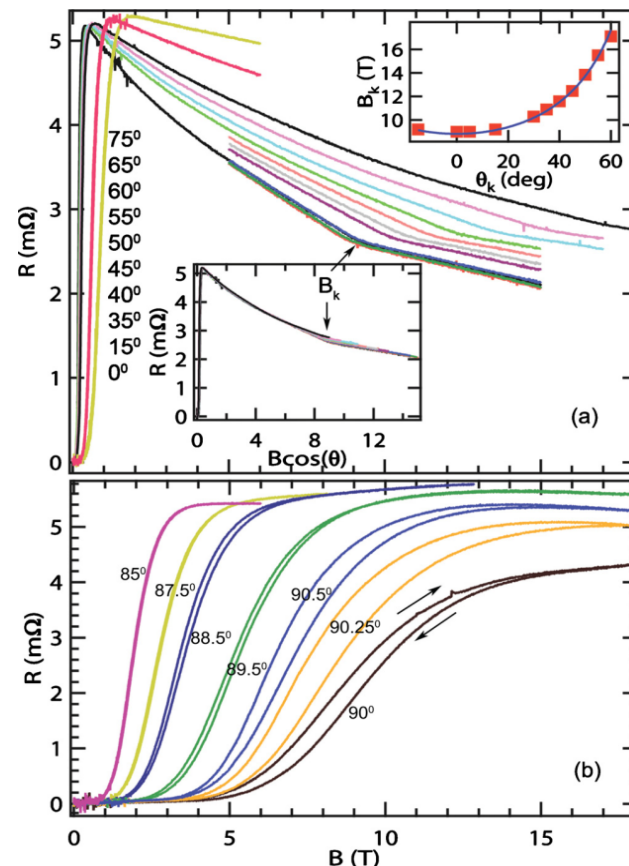
Magnetoresistance and ac susceptibility studies in UCoGe show (i) a ferro-to ferrimagnetic transition at B_k ~ 9T which depends only on the c-axis field component, (ii) reverse hysteresis in the MR in the critical field data that suggests a coupling of the superconductivity to in-plane magnetism, (iii) possible self-induced vortex state, (iv) more complex mechanisms control the critical field parameters, (v) some of the important aspects of this superconducting ferromagnetic system are robust against variation in sample quality.



a) The ac susceptibility and MR of UCoGe for B // c at 40 mK. b) Magnetization with inflection point at B_k.



Angular dependence of the upper critical field B_c and the hysteresis width at 40 mK. Dashed line is the best fit of the anisotropic effective mass model to B_c(θ).



Magnetic field dependence of the resistance in UCoGe at 40 mK for field directions tilted from the c axis to the ab plane. The insets highlight the scaling of the MR and the B_k anomaly with B_ccosθ.

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