

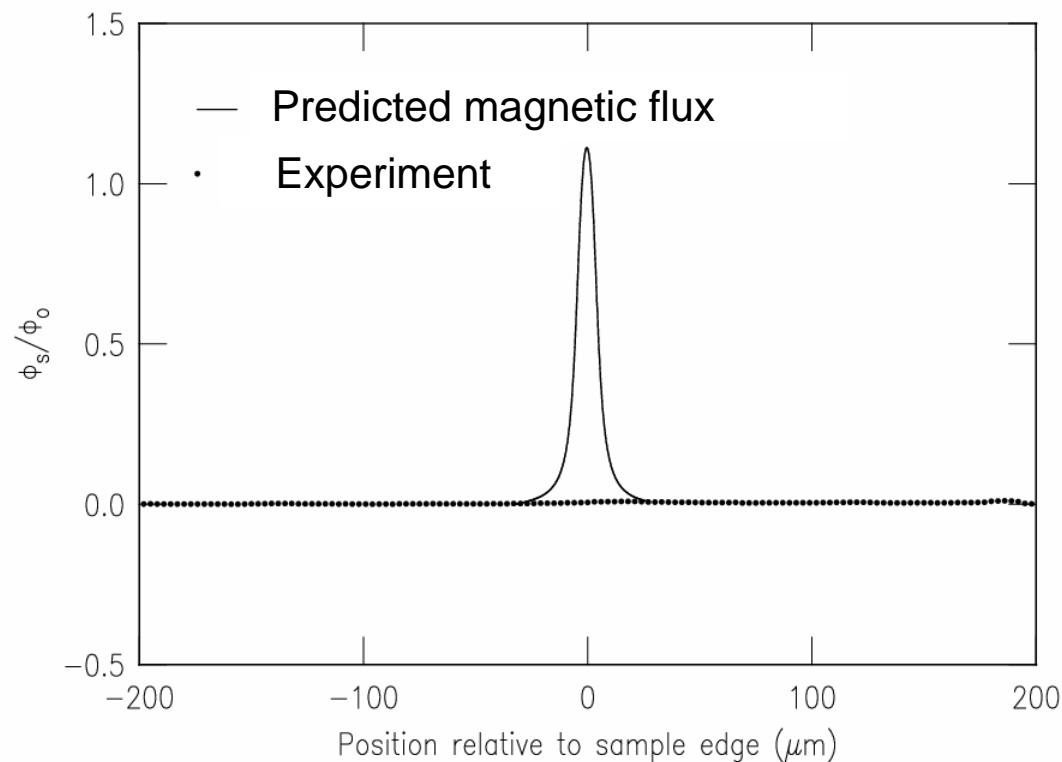
## Upper limits on spontaneous supercurrents in $\text{Sr}_2\text{RuO}_4$

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It is widely believed that  $\text{Sr}_2\text{RuO}_4$  is an unconventional superconductor with pairing between charge carriers with spins parallel to each other, unlike conventional superconductors which have antiparallel pair spins. One of the consequences of such unusual superconductivity should be large spontaneously generated supercurrents both at the sample edges and within the sample. We have done careful imaging of the magnetic fields above  $\text{Sr}_2\text{RuO}_4$  single crystals using scanning Hall bar and SQUID microscopies (see Figure), and show that such supercurrents, if present, are either smaller than predicted by at least two orders of magnitude, or highly localized. In the referenced paper we speculate on the causes and implications of the lack of large spontaneous supercurrents in this very interesting superconducting system.



REFERENCE:

"Upper limits on spontaneous supercurrents in  $\text{Sr}_2\text{RuO}_4$ ", J.R. Kirtley, C. Kallin, C.W. Hicks, E.-A. Kim, Y. Liu, K.A. Moler, Y. Maeno, and K.D. Nelson, *Phys. Rev. B* **76**, 014526 (2007)