Scanning magnetic imaging of strontium ruthenate (Sr$_2$RuO$_4$)$^1$

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MOLER, Department of Applied Physics, Stanford University — Strontium ruthenate is a spin-triplet superconductor with, very likely, a time-reversal symmetry breaking $p_x+ip_y$ orbital order parameter. This is suggested by several experiments, including recent observation of a Kerr effect that develops when Sr$_2$RuO$_4$ becomes superconducting. Such an order parameter should result in spontaneous edge and domain wall currents which would generate a real-space magnetic signal, but this field yet to be observed. Currently it is estimated that, within the sample and near an edge (in the bulk it is Meissner screened), the field should peak at about 6G. We believe the spontaneous edge field may actually be significantly smaller. We discuss its observability through scanning magnetic probe microscopy and describe current experimental efforts to image and measure this field.

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