

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Symmetry breaking field in UPt₃ and connection to superfluid

³He¹ WILLIAM HALPERIN, northwestern university — The multiple superconducting phases of UPt₃ in its temperature-field phase diagram are a strong indication of its unconventional order parameter. It is generally accepted that such a complex phase diagram with 3 different vortex phases are nearly degenerate, and would be so, except for the presence of a symmetry breaking field attributed to antiferromagnetism which appears at a temperature an order of magnitude higher than the superconducting transition.[1] I propose an alternative mechanism where the symmetry breaking field can be, in large part, ascribed to anisotropic electronic scattering from stacking faults. The success of the theory[2] in accounting for stabilization of anisotropic phases of superfluid ³He in globally anisotropic aerogel[3] suggests a similar consequence from anisotropic quasiparticle scattering in UPt₃. Specific heat measurements indicate that the temperature window of the more anisotropic A-phase, a direct measure of the strength of the symmetry breaking field, decreases systematically with fewer stacking faults. [1] D.W. Hess *et al.*, J. Phys.: Condens. Matter **1**, 8135 (1989). [2] E.V. Thuneberg *et al.*, Phys. Rev. Lett. **80**, 2161 (1998). [3] J. Pollanen *et al.*, Nat. Phys. **8**, 317 (2012).

¹NSF DMR-1103625

William Halperin
northwestern university

Date submitted: 06 Nov 2015

Electronic form version 1.4