

Abstract Submitted
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Engineering superfluid ^3He phase stability with disorder¹ J.I.A. LI, A.M. ZIMMERMAN, J. POLLANEN, C.A. COLLETT, W.J. GANNON, W.P. HALPERIN, Northwestern University — We report our NMR measurements on ^3He superfluid in well-characterized aerogel samples, with anisotropy induced by uniaxial compression of $\approx 20\%$. By comparing with our previous work on the same sample without compression, we show that a critical field appears in the $T-H^2$ phase diagram induced by the aerogel anisotropy, providing clear evidence that anisotropic impurity scattering modifies the relative phase stability of different p -wave superfluid state, making the isotropic B-phase energetically more favorable than the magnetic field induced A-phase. Furthermore, we demonstrate that the 3-dimensional glass phase of $^3\text{He-A}$ observed in the isotropic aerogel is suppressed by the anisotropic disorder, and the remaining 2-D continuous symmetry in the plane perpendicular to the strain axis gives rise to a 2-D glass phase of $^3\text{He-A}$, contrary to the expected 1-D alignment of the A-phase texture along the strain axis.

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