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Equal-Spin Pairing Superfluid State of ^{3}He in Radially Compressed Aerogel J. POLLANEN, J. LI, C. COLLETT, W.J. GANNON, W. P. HALPERIN, Northwestern University — Anisotropic quasiparticle scattering has been predicted to stabilize anisotropic superfluid states of ^{3}He [1,2]. We have performed pulsed nuclear magnetic resonance (NMR) experiments on ^{3}He in a homogeneously anisotropic 97.5% porosity aerogel. From the NMR frequency shifts on warming at P = 26 bar we find a single superfluid state exists between $0.7mK$ and $T_{caero} = 1.67mK$. Susceptibility measurements indicate this phase is an equal-spin pairing (ESP) state. The anisotropy of our cylindrical aerogel sample was induced during the growth and drying stages in the form of 14.3% radial compression. The sample was characterized with an optical, cross-polarization technique [3] to confirm the presence of a homogeneous optical axis aligned with the cylinder axis. Similar experiments and characterization have been performed on a homogeneously isotropic 98.1% aerogel and, in this case, we find the non-ESP aerogel B-phase is the stable state. We are currently studying the tip angle dependence of the NMR frequency shift to identify which of the ESP states we have observed and to explore the full P-T phase diagram of superfluid ^{3}He in these aerogels. This work was supported by the National Science Foundation, DMR-0703656. [1] C.L. Vicente, et al., PRB 72, 094519 (2005). [2] K. Aoyama and R. Ikeda, PRB 73, 060504(R) (2006). [3] J. Pollanen et al., JNCS 354, 4668 (2008).

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