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Torsion Pendulum Experiments with Superfluid ^{3}He in "Nematically Ordered" Aerogel NIKOLAY ZHELEV, ERIC SMITH, ABHILASH SEBASTIAN, JEEVAK PARPIA, Cornell University — A new type of highly anisotropic alumina aerogel [1] is used to induce directional disorder in superfluid ^{3}He. The aerogel sample consists of a network of long strands that have a preferred orientation (nematic order). It is placed in the head of a double torsion pendulum with the anisotropy axis oriented along the axis of the pendulum. We observe the frequency shift of the symmetric torsion mode of the pendulum in order to determine the superfluid fraction of the embedded ^{3}He. The superfluid transition temperature of the fluid in the aerogel is measured to be very close to that of bulk ^{3}He. However, in contrast to the bulk phase diagram, the region of stability of the Equal Spin Pairing (ESP) superfluid phase is enhanced on cooling. In addition, unlike the case of ^{3}He in isotropic silica aerogel, the ESP phase reappears on warming. We compare our measurements to the NMR data reported in [2] and discuss the possible structure of the observed superfluid phases.

[1] R.Sh. Askhadullin, et.al, J. Phys.: Conf. Ser. 98, 072012 (2008).
[2] R.Sh. Askhadullin, et.al, JETP Lett. 95, 326 (2012

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