Identification of ^{3}He Superfluid B-phase Order Parameter Structure in Aerogel

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We have performed pulsed NMR on ^{3}He-B in 98.1% porosity aerogel with different anisotropy. The aerogel anisotropy was fully characterized. In the isotropic aerogel sample at P = 26 bar two peaks are observed in the NMR spectrum for superfluid B-phase, which indicates two domains with different order parameter structure. The peak with no frequency shift relative to Larmor Frequency represent a domain with order parameter $\mathbf{l} \perp \mathbf{H}$ near the wall of the sample cell(wall mode), and the peak with a positive frequency shift indicates a domain with order parameter $\mathbf{l} \parallel \mathbf{H}$ away from the wall of the sample cell (bulk mode). With decreasing temperature, the wall mode grows in size while the bulk mode shrinks and below a certain temperature ($T_{crossover}$) the whole sample is in wall mode. With increasing field, the wall mode shrinks in size while the bulk mode grows and the $T_{crossover}$ moves to lower temperature. We can study the tip angle dependence of the NMR frequency shift of each peak, and the result matches the theoretical calculation. We have also studied an anisotropic aerogel which was compressed along its cylinder axis by 22.5%. At the same pressure, we find a similar textural crossover from $\mathbf{l} \parallel \mathbf{H}$ to $\mathbf{l} \perp \mathbf{H}$ with decreasing temperature, but for this sample $T_{crossover}$ occurs at higher temperature. This work was supported by the National Science Foundation, DMR-0703656.