

THE A-B TRANSITION OF SUPERFLUID ^3He IN AEROGEL AND THE EFFECT OF ANISOTROPIC SCATTERING

C.L. Vicente(UF, Physics), H.C. Choi, J.S. Xia (NHMFL, UF), G. Gervais, W.P. Halperin (Northwestern, Physics & Astronomy), N. Mulders (U. of Delaware, Physics), and Y. Lee (UF, Physics)

Introduction

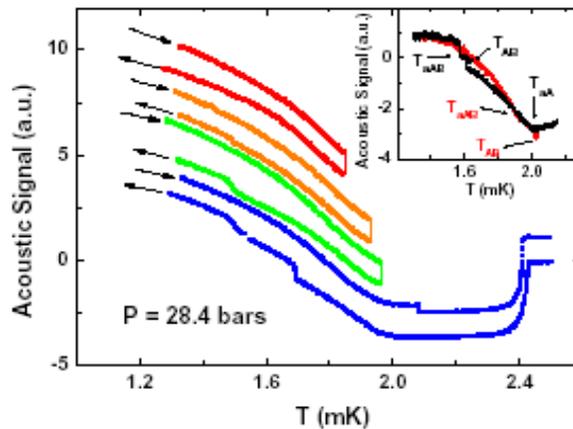
We report the results of high frequency acoustic shear impedance measurements on superfluid ^3He contained in 98% porosity silica aerogel. Using this technique we observed for the first time the A-B transition of Superfluid ^3He in aerogel on warming.

Experimental

These experiments were performed in the NHMFL High B/T facility. A continuous wave shear impedance technique was employed in this study. In this method, an AC-cut quartz transducer, which is in contact with bulk (clean) liquid and (dirty) liquid in aerogel, is excited continuously at a frequency of 8.69 MHz [1].

Results and Discussion

Fig. 1 shows the acoustic traces of tracking experiments at 28.4 bar in zero magnetic Field. Each pair of warming and subsequent cooling is color-coded. The arrows indicate the direction of temperature change in time. In the inset we show the cooling (black) and warming (red) traces taken at around 28.5 bar. The signatures of the aerogel superfluid transition and the aerogel A-B transition are labeled as T_{aA} and T_{aAB} [2].



Conclusions

We have observed the A-B transition in ^3He /aerogel on warming in the absence of magnetic field for two sample pressures of 28.4 and 33.5 bar, and have found evidence that the two phases coexist in a temperature window that can be as wide as 100 μK [2].

Acknowledgments

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References

- [1] Choi, H.C., *et al.*, Phys. Rev. Lett. **93**, 145302 (2004).
- [2] Vicente, C.L., *et al.*, Submitted to Phys. Rev. Lett. October 29 2004