Moderate Magnetic Field Transverse Acoustics Experiments in Superfluid ^{3}He-B

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We present the results of transverse acoustics studies in superfluid ^{3}He-B at fields up to 0.12 T. Using acoustic cavity interferometry, we observe the acoustic Faraday effect[1][2] for a transverse sound wave propagating along the magnetic field, and we measure Faraday rotations of the polarization of the sound up to 2070°, significantly more extensive than has been previously reported. We use these results to extend previous calculations of the Landé g factor. We also find the field dependence of cavity interference oscillations resulting from coupling to the imaginary squashing mode (ISQ), a collective mode of the order parameter with total angular momentum $J = 2$. Measurements in large magnetic fields were performed at frequencies up to the pair breaking threshold, where there has been a recent report[3] of a new collective mode with $J = 4$. Acoustic minima near this new mode are reported, along with their intersection with rotations from the ISQ. Support for this work from the NSF, grant DMR-0703656, is gratefully acknowledged.

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