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Thermal Dephasing in the Laughlin Quasiparticle Interferometer
F.E. CAMINO, WEI ZHOU, V.J. GOLDMAN, Stony Brook University — We report experiments on thermal dephasing of the Aharonov-Bohm oscillations in the novel Laughlin quasiparticle (LQP) interferometer, [1] where quasiparticles of the 1/3 FQH fluid execute a closed path around an island of the 2/5 fluid. In the $10.2 \leq T \leq 141$ mK temperature range, qualitatively, the experimental results follow a thermal dephasing dependence expected for an electron interferometer, and show clear distinction from the activated behavior observed in resonant tunneling and Coulomb blockade devices, both in the chiral Luttinger liquid (χLL) and the Fermi liquid regimes. The data fit very well the χLL dependence predicted for a $g = 1/3$ two point-contact LQP interferometer. [2] The fit yields a value of the chiral edge excitation velocity, $u = 1.4 \times 10^4$ m/s obtained for the first time for a continuous FQH edge excitation spectrum. The small deviation from the zero-bias theory seen below 20 mK indicates yet unrecognized source of experimental decoherence, not included in theory.
[1] F. E. Camino et al., Phys. Rev. B **72**, 075342 (2005).
[2] C. de C. Chamon et al., Phys. Rev. B **55**, 2331 (1997).

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