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**Thouless dephasing and amplitude modulation of Aharonov-Bohm oscillations in mesoscopic InGaAs/InAlAs interferometers** J. J. HEREMANS, S.L. REN, YAO ZHANG, Virginia Tech, Dept. of Physics, C.K. GASPE, S. VIJEYARAGUNATHAN, T.D. MISHIMA, M.B. SANTOS, University of Oklahoma, Homer L. Dodge Dept. of Physics and Astronomy — Aharonov-Bohm oscillations in the low-temperature magnetoresistance of mesoscopic interferometric rings are investigated for their dependence on bias current and temperature, and to explore origins of the observed amplitude modulation in magnetic field. Single-ring interferometers of radius 650 nm and lithographic arm width 300 nm were fabricated on a high-mobility high-density InGaAs/InAlAs heterostructure. The rings show interference oscillations over a wide range of magnetic fields, with amplitudes subject to modulation with applied magnetic field. The quantum phase coherence length is extracted by analysis of the fundamental and higher Fourier components of the oscillations, and by comparative study of the amplitude. The variation of the amplitude with bias current and temperature shows the existence of a critical excitation energy consistent with the Thouless energy for quantum phase smearing. Autocorrelation and Fourier analysis are used to determine the quasi-period of the amplitude modulation, which is found to be consistent with an origin in the magnetic flux threading the finite width of the interferometer arms, changing the mesoscopic realization of the system. Supported by DOE DE-FG02-08ER46532 (VT) and NSF DMR-0520550 (UoO).

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