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Realization of a primary-filling e/3 quasiparticle interferometer
F.E. CAMINO, W. ZHOU, V.J. GOLDMAN, Stony Brook University — We report experiments on a quasiparticle interferometer where the entire system is on the f=1/3 primary fractional quantum Hall plateau. Electron-beam lithography is used to define an electron island separated from the 2D bulk by two wide constrictions, much less depleted than in our prior work [1]. This results in the entire electron island being at filling f=1/3 under quantum-coherent tunneling conditions. For the first time in such devices we report interferometric Aharonov-Bohm-like conductance oscillations. The flux and charge periods of the interferometer device are calibrated with electrons in the integer regime. In the fractional regime, we observe magnetic flux and charge periods h/e and $e/3$, respectively, corresponding to creation of one quasielectron in the island. These periods are the same as in quantum antidots, but the quasiparticle path encloses no electron vacuum in the interferometer. Quantum theory predicts a $3h/e$ flux period for charge $e/3$, integer statistics particles. Accordingly, the observed periods demonstrate anyonic statistics of Laughlin quasiparticles.
[1] F. E. Camino et al., PRL 95, 246802 (2005); PRB 72, 075342 (2005).

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