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Detecting fractional statistics with anyonic Mach-Zehnder interferometer[1]

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Fractionally charged quasiparticles in the quantum Hall state with filling factor $\nu = 5/2$ are expected to obey non-Abelian statistics. We demonstrate that their statistics can be probed by transport measurements in a recently fabricated device, an electronic Mach-Zehnder interferometer. The tunneling current through the interferometer exhibits a characteristic dependence on the magnetic flux and a non-analytic dependence on the tunneling amplitudes which can be controlled by gate voltages. In contrast to the case of Abelian statistics, the I-V curve is asymmetric.

[1] K. T. Law, D. E. Feldman, and Y. Gefen, Phys. Rev. B 74, 045319 (2006).

[2] D. E. Feldman and A. Kitaev, cond-mat/0607541.

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