Fabry-Perot interferometry with stochastic anyonic sources

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We investigate the interference of Laughlin quasiparticles (QPs) in the fractional quantum Hall regime that are stochastically injected into a Fabry-Perot interferometer [1]. We find that the effective Aharonov-Bohm (AB) phase accumulated along the interferometer loop acquires an additional contribution of $\sin(2\pi\lambda)/2$ per QP present on it, where $\pi\lambda$ is the QP exchange phase. This contribution originates from time-domain braiding processes associated with injected QPs passing the interferometer quantum point contacts. In the limit of symmetric QP injection, the tunneling current noise exhibits AB oscillations as a function of the total injected current, providing access to the exchange phase $\pi\lambda$. In the regime of large total injection, we identify a universal Fano factor that displays power-law scaling and a characteristic phase shift reflecting real-space QP braiding along the interferometer edges. These results are relevant for accessing anyonic exchange statistics in mesoscopic interferometers.

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[1] Fabry-Perot interferometry with stochastic anyonic sources, Sarthak Girdhar, Edvin G. Idrisov, Thomas L. Schmidt, arXiv:2603.05052 [cond-mat.mes-hall] (2026)