Finite width of anyons changes their braiding signatures

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Anyons are particles intermediate between fermions and bosons, characterized by a nontrivial exchange phase, yielding remarkable braiding statistics. Recent experiments have shown that anyonic braiding has observable consequences on edge transport in the fractional quantum Hall effect (FQHE). In this talk, we present transport signatures of anyonic braiding when the anyons have a finite temporal width. We show that the width of the anyons, even extremely small, can have a tremendous impact on transport properties and braiding signatures. In particular, we find that taking the finite width into account allows us to explain recent experimental results on FQHE at filling factor $2/5$ [Ruelle et al., Phys. Rev. X 13, 011031 (2023)]. Our work shows that the finite width of anyons crucially influences setups involving anyonic braiding, especially for composite fractions where the exchange phase is larger than $\pi/2$.