Non-Abelian Braiding of Lattice Bosons ELIOT KAPIT, PAUL
GINSPARG, ERICH MUELLER, Cornell University — We report on a numerical
experiment in which we use time-dependent potentials to braid non-abelian quasi-
particles. We consider lattice bosons in a uniform magnetic field within the fractional
quantum Hall regime, where ν, the ratio of particles to flux quanta, is near 1/2, 1 or
3/2. We introduce time-dependent potentials which move quasiparticle excitations
around one another, explicitly simulating a braiding operation which could imple-
ment part of a gate in a quantum computation. We find that different braids do
not commute for ν near 1 and 3/2, with Berry matrices respectively consistent with
Ising and Fibonacci anyons. Near $\nu = 1/2$, the braids commute.

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