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Fractional Quantum Hall states on an infinite cylinder: topological properties and edge exponents using the iDMRG MICHAEL ZALETEL, UC Berkeley, ROGER MONG, California Institute of Technology, JOEL MOORE, UC Berkeley, FRANK POLLMANN, Max Planck Institute for the Physics of Complex Systems — Exact diagonalization has been a tremendously successful approach to quantum Hall numerics, but is limited for certain applications due to finite size effects. We show how the infinite density matrix renormalization group (iDMRG) can be adapted to study microscopic quantum Hall Hamiltonians on a cylinder of infinite length. Using iDMRG to obtain the set of topologically degenerate ground states in their matrix product state form allows us to determine the energy, charge, quantum dimension and topological spin of the quasi-particles. When a trapping potential around the cylinder is introduced the fluid collapses into an infinitely long strip, an ideal geometry for extracting the central charge and edge exponents without the usual finite size effects.

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