Abstract Submitted
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Topological defects on the lattice[1] DAVID AASEN, Caltech, ROGER MONG, University of Pittsburgh, PAUL FENDLEY, Oxford — We construct defects in two-dimensional classical lattice models and one-dimensional quantum chains that are topologically invariant in the continuum limit. We show explicitly that these defect lines and their trivalent junctions commute with the transfer matrix/Hamiltonian. The resulting splitting and joining properties of the defect lines are exactly those of anyons in a topological phase. One useful consequence is an explicit definition of twisted boundary conditions that yield the precise shift in momentum quantization, and so provide a natural way of relating microscopic and macroscopic properties. Another is a generalization of Kramers-Wannier duality to a wide class of height models. Even more strikingly, we derive the modular transformation matrices explicitly and exactly from purely lattice considerations. We develop this construction for a variety of examples including the two-dimensional Ising model.

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