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Quantum Spin Hall Effect in HgTe in a Magnetic Field TAYLOR HUGHES, Stanford University, ANDREI BERNEVIG, Princeton University, SHOU-CHENG ZHANG, Stanford University — Recently, the quantum spin Hall effect has been proposed in HgTe quantum wells. It has been shown that this system exhibits the quantum spin Hall effect and the Hamiltonian is analogous to two copies of the quantum anomalous Hall effect. Here we examine the features of this system in a strong magnetic field. We use an analytic transfer matrix formalism to study the system on a lattice in a strip geometry in the presence of a strong perpendicular magnetic field. We characterize the bulk band structure and edge states for various applied field strengths and discuss possible experimental signatures of the quantum spin Hall effect. We also discuss possible discrepancies between the continuum and lattice picture.

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