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**Investigation of a driven fermionic system and detecting chiral edge modes in an optical lattice** FREDERIK GRG, MICHAEL MESSER, GREGOR JOTZU, KILIAN SANDHOLZER, RMI DESBUQUOIS, Institute for Quantum Electronics, ETH Zurich, 8093 Zurich, Switzerland, NATHAN GOLDMAN, CENOLI, Facult des Sciences, Universit Libre de Bruxelles (U.L.B.), B-1050 Brussels, Belgium, TILMAN ESSLINGER, Institute for Quantum Electronics, ETH Zurich, 8093 Zurich, Switzerland — Periodically driven systems of ultracold fermions in optical lattices allow to implement a large variety of effective Hamiltonians through Floquet engineering. An important question is whether this method can be extended to interacting systems. We investigate driven two-body systems in an array of double wells and measure the double occupancy and the spin-spin correlator in the large frequency limit and when driving resonantly to an energy scale of the underlying static Hamiltonian. We analyze whether the emerging states of the driven system can be adiabatically connected to states in the unshaken lattice. In addition, we measure the amplitude of the micromotion which describes the short time dynamics of the system and compare it directly to theory. In another context we propose a method to create topological interfaces and detect chiral edge modes in a two dimensional optical lattice. We illustrate this through an optical lattice realization of the Haldane model for cold atoms, where an additional spatially-varying lattice potential induces distinct topological phases in separated regions of space.

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