

Abstract Submitted  
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**Quantum gas microscope**<sup>1</sup> JONATHON GILLEN, WASEEM BAKR, AMY PENG, SIMON FOELLING, MARKUS GREINER, Harvard University — Ultracold quantum gases in optical lattices have opened the door to studying fundamental questions of modern condensed matter physics with atomic physics experiments. The idea is to build an enlarged model of a quantum material, with ultracold atoms in the lattice playing the role of electrons or cooper pairs in real materials. In this way it becomes possible to experimentally realize condensed matter Hamiltonians and simulate for example bosonic and fermionic Hubbard models. In my talk I will focus on our new experiment in which we build a quantum gas microscope that we plan to use as a quantum simulator. This experiment will allow us to control the quantum gas on a single lattice site level, paving the way to simulating a wide variety of Hamiltonians.

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