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Synthetic Quantum Matter under the Microscope

MARKUS GREINER, Harvard University, Physics Dept.

Ultracold atoms in optical lattices enable experimenters to create and study synthetic quantum matter, opening a window into the fascinating world of many-body quantum physics. With quantum gas microscopy we are now able to take the control of atoms in an optical lattice to the next and ultimate level of high fidelity addressing, manipulation and readout of single particles. I will present microscopic studies of strongly correlated quantum matter and the first realization of quantum magnetism in an optical lattice. This work opens a wide range of new possibilities and brings the realization of exotic states of matter within experimental reach.