

DAMOP13-2013-000932

Abstract for an Invited Paper
for the DAMOP13 Meeting of
the American Physical Society

I.I. Rabi Prize Talk - A close-up of synthetic quantum matter

MARKUS GREINER, Harvard University

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.