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Fermi-Hubbard physics with ultracold fermions in optical lattices THOMAS UEHLINGER, DANIEL GREIF, GREGOR JOTZU, LETICIA TARRUELL, TILMAN ESSLINGER, ETH Zurich, Switzerland — The Fermi-Hubbard Hamiltonian is one of the key models for strongly correlated electrons in solid state systems and incorporates fascinating phenomena such as Mott insulating behavior and spin ordered phases. Despite intense numerical effort, a number of questions still remains open, in particular on the low temperature phases where spin degrees of freedom start to play a role. In our experiment we use a two-component Fermi gas loaded into an optical lattice to realize this simple model Hamiltonian. Currently several experiments are reaching out to access the regime of quantum magnetism. We report on recent progress of creation and characterization of low entropy states in the lattice.

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