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Towards quantum many-body physics with Sr in optical lattices SEBASTIAN BLATT, NEJC JANSA, RODRIGO G. ESCUDERO, ANDRÉ HEINZ, ANNIE JIHYUN PARK, STEPAN SNIGIREV, Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Straße 1, 85784 Garching, Germany, JEAN DALIBARD, Laboratoire Kastler Brossel, Collège de France, ENS-PSL Res. Univ., CNRS, UPMC-Sorbonne Universités, 11 place Marcelin Berthelot, Paris, France, IMMANUEL BLOCH, Max-Planck-Institut für Quantenoptik, Hans-Kopfermann-Straße 1, 85784 Garching, Germany — Within the last decade, fermionic alkaline earth atoms in optical lattices have become a platform for precision measurements, culminating in the realization of an atomic clock with the currently highest stability and accuracy at the 2×10^{-18} level. In the meantime, quantum degenerate gases of all bosonic and fermionic isotopes of Sr have been realized. With the extension of the quantum gas microscopy technique to fermionic alkali metal atoms, experiments with quantum degenerate gases in optical lattices have taken another step towards full control over the internal and external degrees of freedom of fermions in optical lattices. Here, we report on the construction of a new experiment with quantum degenerate gases of Sr in optical lattices. Our experiment aims to combine the high spatial control over the atomic degrees of freedom from quantum gas microscopy with the precision control over the internal degrees of freedom enabled by optical lattice clock techniques.

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