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Bose and Fermi Gases of Ultracold Ytterbium in a Triangular Optical Lattice[1] ALEXANDER THOBE, SOEREN DOERSCHER, BASTIAN HUNDT, ANDRE KOCHANKE, CHRISTOPH BECKER, KLAUS SENGSTOCK, Zentrum fur Optische Quantentechnologien - Uni Hamburg — Quantum gases of alkaline-earth like atoms such as Calcium, Strontium and Ytterbium (Yb) open up exciting new possibilities for the study of many body physics in optical lattices, ranging from SU(N) symmetric spin Hamiltonians to the Kondo Lattice Model. Here, we present experimental studies of ultracold bosonic and fermionic Yb quantum gases. Unlike other experiments studying ultracold alkaline earth-like atoms, we have implemented a 2D-MOT instead of a Zeeman slower as a source of cold atoms. From the 2D-MOT, operating on the broad $^1S_0 \rightarrow {}^1P_1$ transtition, the atoms are directly loaded into the 3D-MOT operating on a narrow intercombination line. The atoms are then evaporatively cooled to quantum degeneracy in a crossed optical dipole trap. With this setup we routinely produce BECs and degenerate Fermi gases of different Yb isotopes. Moreover, we present first results on spectroscopy of an interacting fermi gas on the ultranarrow $^1S_0 \rightarrow {}^3P_0$ clock transition in a magic wavelength optical lattice. In future experiments, this spectroscopy will serve as a versatile tool for interaction sensing and selective addressing of atoms in a wavelength tunable, state dependent, triangular optical lattice, which we are currently implementing.

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