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Quantum-degenerate Bose-Fermi mixtures on one-dimensional optical lattices PINAKI SENGUPTA, University of Southern California, LEONID P. PRYADKO, University of California, Riverside — Using a quantum Monte Carlo method, mean field theory, and a strong-coupling expansion, we map out the ground state phase diagram of a mixture of ultracold bosons and spin-polarized fermions in a one-dimensional optical lattice. The properties of the uniform phases and their stability toward phase separation into pure boson and pure fermion phases are studied in detail over a wide range of chemical potentials for boson-boson and boson-fermion interactions ranging from weak to strong coupling limits. The nature of different phases is characterized by computing the charge stiffness, bosonic superfluid stiffness, and density-density correlation functions.

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