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Quantum phases of multi-component ultracold atom systems

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Cold atoms in optical lattices offer an intriguing new laboratory where quantum many-body phenomena can be realized which are out of reach in solids. They can even serve as quantum simulators for notoriously difficult problems like high-temperature superconductivity. In this talk I will focus on new theoretical developments in multicomponent- and disordered systems: Fermionic atoms with $SU(N)$ symmetry have exotic superfluid and flavor-ordered ground states. I will discuss symmetry breaking, collective modes and detection issues. Optical lattices are also ideal tools to simulate quantum systems with disorder and interaction. I will present new results on Anderson- vs. Mott localization obtained within a stochastic DMFT treatment.