For the past two decades ultracold Bose and Fermi atomic gases have been used with great success to study fundamental many-body physics. While traditionally they were produced in harmonic electromagnetic traps, it recently also became possible to create them in the uniform potential of an optical box trap [1]. This has opened even more possibilities for fundamental studies, allowing closer connections with other many-body systems and the theories that rely on the translational symmetry of the system. Research topics for which the homogeneous, box-trapped quantum gases offer distinct advantages include critical phenomena near phase transitions [2], quantum turbulence [3], and strongly interacting gases [4,5]. I will give an overview of our recent experiments on these systems.


