Light has many important properties and applications. Light exerts forces on particles and objects. These forces deflect the tails of comets, they are used in the form of optical tweezers to manipulate cells and DNA, and they allow the trapping of atoms. These forces are microscopically explained by the momentum of the photon, the quantum of light. Photons also have energy which can be used to heat pellets to temperatures comparable to those inside the sun and enable nuclear fusion. However, laser light can also cool matter to temperatures close to absolute zero. In this regime, new materials with novel properties are observed.

Dr. Wolfgang Ketterle is the John D. MacArthur Professor of Physics at MIT. His group was the first in the world to achieve Bose-Einstein condensation in a dilute gas of sodium atoms. In 2001 Professor Ketterle, together with Eric Cornell and Carl Wieman, won the Nobel Prize in Physics "for the achievement of Bose-Einstein condensation in dilute gases of alkali atoms, and for early fundamental studies of the properties of the condensates".