

Prof. William Daniel Phillips

Prof. William D. Phillips, the Man who froze atoms, has been a leading researcher in the field of laser cooling of atoms since 1978. He is currently a Distinguished Professor of Physics at the University of Maryland and also serves as a Physicist at the National Institute of Standards and Technology. He obtained his Ph.D. in 1976 from Massachusetts Institute of Technology (MIT) and after which he completed his postdoctoral research, also at MIT. He is internationally renowned for advancing basic knowledge and new techniques to laser-cool atoms to extremely low temperatures.

Phillips began his experiments with laser trapping and cooling shortly after he arrived in 1978 at the National Institute of Standards and Technology, with the intent of creating a more accurate atomic clock. Several of his innovations in the following years became landmarks in the field.

His experiments demonstrated that a beam of neutral atoms could be slowed down and cooled with radiation pressure from a laser and that atoms cooled by lasers could reach much lower temperatures than had been predicted theoretically.

He developed the Zeeman slower, which is a scientific apparatus that is commonly used in quantum optics to cool a beam of atoms from room temperature or above to a few Kelvins.

His collaborative research with Steven Chu and Claude Cohen-Tannoudji led to the first observation of the Bose-Einstein condensate in 1995, an exotic new form of matter in which atoms all fall to their lowest levels and merge into a single quantum state. Bose-Einstein condensates have a wide range of potential applications, including the development of new precision clocks and sensors.

In 1997, Dr. Phillips received the Nobel Prize in Physics with Claude Cohen Tannoudji and Steven Chu for developing methods to cool and trap atoms with laser light.

Prof. Phillips's broad research areas include Atomic, Molecular & Optical (AMO) physics. He has explored some of the most exciting and hottest areas of physics. Among these are: laser cooling and trapping; quantum optics; atom optics; ultracold collisions; ultracold plasmas; quantum information; ion trap quantum computing and simulation; quantum-degenerate gases. Recent advances in these areas have opened so many new avenues of research in AMO such that this field is one of the most rapidly expanding in all of physics.

Phillips's work has led to the creation of some of the most important technologies of modern atomic physics, which thousands of researchers worldwide employ today for a wide variety of applications.

He is a true pioneer in the field of physics and a role model for scientists around the world.

What is particularly remarkable about Prof. Phillips is that, along with his profound scientific commitment, he is also a man of deep religious belief.