Curriculum Vitae Professor Dr Wolfgang Ketterle

Name: **Wolfgang Ketterle**
Date of birth: **21 October 1957**

Research Priorities: Bose-Einstein condensate, condensates, bosons, ultracold atoms, quantum gases, sodium atoms, atomic lasers

Wolfgang Ketterle is a physicist. In 2001, he received the Nobel Prize in Physics, together with Eric A. Cornell and Carl E. Wieman, for the creation of Bose-Einstein condensation and early fundamental studies on the properties of condensates. Wolfgang Ketterle was one of the first researchers to succeed in creating a Bose-Einstein condensate. He also developed the fundamentals for the atomic laser.

Academic and Professional Career

since 2006	Director, MIT-Harvard Center of Ultracold Atoms (CUA), Massachusetts Institute of Technology (MIT), Cambridge, USA
since 2006	Associate Director, Research Laboratory of Electronics (RLE), MIT, Cambridge, USA
since 1998	John D. MacArthur Professor of Physics, MIT, Cambridge, USA
1997 - 1998	Professor for physics, MIT, Cambridge, USA
1993 - 1997	Assistant Professor for Physics, MIT, Cambridge, USA
1990 - 1993	Visiting Researcher, MIT, Cambridge, USA
1989 - 1990	Research Scientist, Department of Physical Chemistry, Heidelberg University, Germany
1985 - 1988	Research Associate, Max Planck Institute of Quantum Optics (MPQ), Garching, Germany
1982 - 1985	Research Assistant, MPQ, Garching, Germany
1983 - 1986	PhD in physics, Ludwig-Maximilians-Universität München (LMU), and MPQ, Germany

1982	Diploma in physics, Technical University of Munich (TUM), Germany
	Study of physics, TUM, Germany

Honours and Awarded Memberships

2011	Foreign Member, Russian Academy of Sciences (RAS), Russia
2009	Honorary Member, German Association of University Professors and Lecturers, Germany
2009	James Joyce Award, Literary & Historical Society, University College, Dublin, Ireland
2009	Leonie Wild Medal, City of Eppelheim, Germany
2009	Humboldt Foundation's research award, Alexander von Humboldt-Foundation, Bonn, Germany
2006	Fellow, Optical Society of America (OSA), USA
since 2005	Member, German National Academy of Sciences Leopoldina, Germany
2004	Killian Award, MIT, Cambridge, USA
since 2003	Member, Bavarian Academy of Sciences and Humanities, Munich, Germany
since 2002	Member, European Academy of Sciences and Arts (ESA), Austria
2002	Fellow, Institute of Physics (IOP), London, UK
since 2002	Foreign Member, National Academy of Sciences (NAS), USA
since 2002	Titular Member, European Academy of Arts, Sciences and Humanities (EAASH)
since 2002	Member, Heidelberger Akademie der Wissenschaften (HAdW), Germany
2002	Order of Merit, State of Baden-Württemberg, Germany
2002	Officer of the National Order of the Legion of Honour, Government of France, France
2002	Grand Cross of Merit with Star and Sash, Federal Republic of Germany
2001	Nobel Prize in Physics (shared with Eric A. Cornell and Carl E. Wieman), Royal Swedish Academy of Sciences (KVA), Sweden
2000	Benjamin Franklin Medal, The Franklin Institute, Philadelphia, USA
1999	Fellow, American Academy of Arts and Sciences (AAAS), USA
1999	Dannie Heineman Prize, Göttingen Academy of Sciences and Humanities, Germany
1999	Fritz London Prize in Low Temperature Physics, International Union of Pure and Applied Physics (IUPAP), Trieste, Italy
1998	Award for Technological Innovation, Discover Magazine

1998 - 1999	Distinguished Traveling Lecturer, Division of Laser Science, American Physical Society (APS), USA
1997	Fellow, APS, USA
1997	Gustav Hertz Prize, German Physical Society (DPG), Germany
1997	I.I. Rabi Prize, APS, USA
1996	David and Lucile Packard Fellowship, David and Lucile Packard Foundation, Los Altos, USA
1994	Michael and Philip Platzman Award, MIT, Cambridge, USA
1990 - 1991	NATO/DAAD Postdoctoral Fellowship
1976 - 1982	Fellowship, Studienstiftung des deutschen Volkes
	Recipient of a wide selection of honorary doctorates

Research Priorities

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The Bose-Einstein condensate (BEC) is a new state of matter. Certain elementary particles, the bosons, have an identical energy level in this state. They oscillate in sync, can no longer be distinguished and behave like a single particle. Typically, elementary particles have different speeds; some are more energetic than others. To obtain a BEC, a gas composed of these particles must be cooled to a very low temperature, down to minus 273 degrees Celsius. In this extreme cold, the atoms condense into an object. This option was already described in 1924 by the Indian physicist Satyendra Nath Bose and by Albert Einstein. But it was not until 1995 that the three scientists succeeded in producing this state.

Eric A. Cornell and Carl E. Wieman produced a condensate of rubidium atoms at a temperature of 20 nanokelvin (20 billionths of a degree Celsius above absolute zero). Wolfgang Ketterle experimented in parallel with sodium atoms. A short time later, he succeeded in creating a Bose-Einstein condensate that consisted of a larger number of atoms and was, therefore, more suitable for further investigations. Thus, Wolfgang Ketterle created two condensates that showed interference patterns upon contact, comparable to the water's surface when two stones are thrown into it. With this experiment, he was able to prove that the atoms in the condensate behaved in a completely coordinated manner.

In subsequent research work, Wolfgang Ketterle generated a beam of small “BEC drops”. They

“fell down” due to gravity - this was the basis for the development of a “laser beam” with matter instead of light. In recent years, Wolfgang Ketterle conducted new experiments with the Bose-Einstein condensate. He continues to research this state at the Center for Ultracold Atoms (CUA) at the Massachusetts Institute of Technology (MIT).