

Garching, June 28, 2013

Press Release

Manuel Endres receives “PhD prize” of the Münchner Universitätsgesellschaft

For his excellent doctoral thesis, the young physicist Manuel Endres has been elected by the *Münchner Universitätsgesellschaft* for the “Promotionspreis 2013”. His experiment was carried out in the group of Prof. Immanuel Bloch (Chair for Experimental Quantum Optics at the Ludwig-Maximilians-Universität Munich (LMU) and Director at the Max-Planck-Institute of Quantum Optics). The *Münchner Universitätsgesellschaft* was founded in 1922 during a period of high inflation in Germany. Its goal was and still is to financially support the University of Munich, in particular in its scientific research and teaching duties. It is part of these supporting measures to give awards for excellent doctoral and habilitation theses to persons who graduate from the Ludwig-Maximilians-Universität München.



Manuel Endres, born in Würzburg (Germany), began his education with the study of Computer Science at the University of Applied Sciences Würzburg. After his pre-diploma, he went to the Philipps-Universität Marburg to study physics. There, he received his physics diploma in 2008. His diploma thesis was supervised by Prof. Immanuel Bloch (at that time Chair of Experimental Physics at the Johannes-Gutenberg-Universität Mainz). In 2008, Manuel Endres started to work on his doctoral thesis in the Quantum Many-Body Systems Division of Prof.

Bloch at MPQ. His main focus was on the investigation of ultracold quantum gases. With the support of Prof. Stefan Kuhr (now at the University of Strathclyde, Scotland) he was able to develop a novel technique for the detection of single atoms in optical lattices. “Manuel Endres has realized a revolutionary technique for observing and controlling such artificial quantum matter,” Prof. Immanuel Bloch says.

In March 2013 Endres obtained his doctorate at the LMU with “summa cum laude”. The topic of his doctoral thesis was “Probing correlated quantum many-body systems at the single-particle level”. He continues his research at MPQ as a postdoctoral research scientist in the Theory Division of Prof. Ignacio Cirac.

In the past years, ultracold quantum gases have proven to be excellent models of strongly interacting many-body systems, from extended stellar systems to high-tech materials. The single-atom sensitivity of the new method used for the investigation of such matter is achieved by fluorescence detection of individual atoms. A high-resolution objective collects the fluorescence light and yields in situ snapshots of the quantum gas, which allows for a single-site-resolved reconstruction of the atomic distribution. A series of such snap shots provides information on the particle correlations. For the first time, the new method makes it possible to experimentally detect even non-local correlations between atoms on different lattice sites

In the course of these experiments, Endres has developed a new way of determining the temperature of a quantum many-body system, which in turn reflects the system’s excitation spectrum. In particular, he was able to demon-

Press &
Public Relations
Dr. Olivia Meyer-Streng

Phone:
+49 - 89 / 32 905-213
E-mail: olivia.meyer-streng@mpq.mpg.de

Hans-Kopfermann-Str. 1
D-85748 Garching

Phone: +49 - 89 / 32 905-0
Fax: +49 - 89 / 32 905-200

strate that collective excitations of superfluids close to the point of a quantum phase transition can show up as 'Higgs'-like amplitude modes.

From November 2003 until March 2008, Manuel Endres received a grant from the *Studienstiftung des deutschen Volkes*. From August 2009 to January 2011, he was supported with a doctoral grant from the Max Planck Society. The *Promotionspreis* will be awarded to Dr. Endres on the occasion of the 541st celebration of the foundation in the Auditorium Maximum at the LMU on June 28, 2013. *Olivia Meyer-Streng*

Contact:

Dr. Manuel Endres

Max-Planck-Institute of Quantum Optics
Hans-Kopfermann-Straße 1
85748 Garching b. München
Phone: +49 (0) 89 / 32905 -214
E-mail: manuel.endres@mpq.mpg.de

Prof. Dr. Immanuel Bloch

Chair of Quantum Optics
LMU Munich, Schellingstr. 4
80799 München, Germany, and
Max-Planck-Institute of Quantum Optics
Hans-Kopfermann-Straße 1
85748 Garching b. München
Phone: +49 (0) 89 / 32905 -138
E-mail: immanuel.bloch@mpq.mpg.de