

## **PRESS RELEASE**

September 30, 2008

### **Team of German Researchers to Receive Honda Prize 2008 for Their Achievement in Aberration-Corrected Transmission Electron Microscopy for High-Resolution Visualization of Atomic Structures**

The Honda Foundation, co-founded by Soichiro Honda and his younger brother Benjiro Honda, and currently headed by Hiromori Kawashima, is pleased to announce the Honda Prize for the year 2008 will be awarded to a German team of researchers of electron microscopy led by Dr. Maximilian Haider, Dr. Harald Rose, and Dr. Knut Urban. Their team developed the world-first Atomic Electron Microscope, a type of transmission electron microscope (TEM)<sup>1</sup> capable of atomic-level imaging using aberration correction technology. The team will be the 29th laureate of the prize.

The basic theory of aberration correction for high-resolution imaging was introduced by Dr. Otto Scherzer of Germany in the 1940's. Many researchers attempted, but failed, its implementation as an aberration-corrected electron microscope; and experts had questioned its technical feasibility by the time the laureates, who thought otherwise, were teamed in 1989. The laureates refined the basic theory in light of materials science and combined it with electron optical engineering techniques to attain the mechanical stability required for electron microscopy. In 1997 they succeeded in making an aberration-corrected TEM that is capable of high-resolution imaging of atomic structures.

This aberration-corrected microscopic technology used for the TEM is now made available to microscope manufacturers in Germany, Japan and other countries through CEOS, a project spin-off company headed by Dr. Haider, to be distributed worldwide for its applications. The TEM has become one of the essential instruments for research and development on an atomic level. It is used not only to produce ultrafine particles for advanced, high-integrated semiconductor devices, but to analyze and examine the atomic arrangements, structures, and binding of various materials in industries like metallic engineering, biotechnology, and nanotechnology. Many users expect new materials could be discovered and macroscopic properties could be analyzed at atomic levels by use of this technology.

In the research project, Dr. Rose has been chiefly responsible for the basic design of the corrector and the refinement of the theory of image formation, whereas Dr. Urban has worked for the application of the refined theory based on his expertise in materials science, and Dr. Haider has used his knowledge in electron optical engineering for the elaborate design and development of this new aberration-corrected technology. The Honda Foundation recognizes the three physicists for their spirit of challenge as well as substantial contributions to human life through their sophisticated technological achievement that we believe embodies the ethos of Ecotechnology.<sup>2</sup>

The 29th award ceremony for the Honda Prize will be held at the Imperial Hotel Tokyo on Monday, November 17th 2008. In addition to the prize diploma and medal, a prize of 10 million yen will be awarded to the team of the laureates.

**For more details:**

Please visit <http://www.honda-foundation.jp> or call the Honda Foundation at +81-3-3274-5125 (Fax: +81-3-3274-5103, Local Address: 6-20, Yaesu 2-chome, Chuo-ku, Tokyo, 104-0028, JAPAN); or please call Honda Motor's Public Relations at +81-3-5412-1512

---

<sup>1</sup> **Transmission Electron Microscope (TEM)**

A type of electron microscope which allows the user to determine the internal structure of materials on the image created by a beam of electrons being transmitted through an ultra thin specimen, interacting with the specimen as it passes through it.

<sup>2</sup> **Ecotechnology**

Honda Foundation's guiding principle since 1979 coined from ecology and technology, where ecology connotes the entire global system including human civilization. This technologic concept calls for harmonious development and use of technology with human beings and their environment.

## Profile of 2008 Honda Prize Laureates



**Dr. Harald H. Rose**

**Dr. Maximilian Haider**

**Dr. Knut Wolf Urban**

### **Dr. Maximilian Haider**

**Born** 23 January 1950, Freistadt, Austria  
**Education** Pre-diploma examination, University of Kiel  
Continuation of Physics, Darmstadt University of Technology (TU Darmstadt)  
Examination of Physics Diploma, TU Darmstadt, Prof. Rose  
**Career** 1982 Scientist, group of Prof. Dr. H. Rose at Inst. of Applied Physics  
1983 Scientist, European Laboratory, Molecular Biology, Dr. A. V. Jones  
1987 Ph. D. to Dr. rer. nat. at the TU Darmstadt, Prof. Rose.  
1989 Head of Group, Application of a Scanning Transmission Electron  
Microscope and development of Electron Microscopes  
1996 Head of research project: Cs-Correction of a 200 kV TEM  
1996 Managing Director, CEOS GmbH, Heidelberg

### **Dr. Harald H. Rose**

**Born** 14 February 1935, Bremen, Germany  
**Education** Studies in Physics & Mathematics, TU Darmstadt  
Master Degree in Physics and Ph. D. in Physics, TU Darmstadt  
**Career** 1965 Post Doc. Position, Institute of Theoretical Physics, TU Darmstadt  
1971 Associate Professor, Institute of Applied Physics, TU Darmstadt  
1976 Principal Research Scientist, New York State Department of Health  
1977 Adjunct Professor, Rensselaer Polytechnic Institute, Troy, NY  
1980 Professor of Physics, Institute of Applied Physics, TU Darmstadt  
1987 Visiting Professor, Physics, Jiaotong University Xian, China  
2001 Research Fellow, Materials Science, Argonne National Lab., Argonne IL  
2003 Research Fellow, Advanced Light Source, L. Berkeley National Lab.

### **Dr. Knut Wolf Urban**

**Born** 1941, Stuttgart, Germany  
**Education** Studied physics and Doctor Degree, natural sciences, Technical Univ. of Stuttgart  
**Career** Max-Planck-Institute for Metals Research in Stuttgart, Germany  
Section de Recherche de Metallurgie Physique at CEN de Saclay/ Paris, France  
Bhabha Atomic Research Centre, Bombay, India  
Institute for Advanced Materials Processing, Tohoku University, Sendai, Japan  
1984 Professor in Materials Science, University of Erlangen  
1987 Chair for Experimental Physics, RWTH Aachen University  
1987 Founded Institute for Microstructure Research, Research Centre Juelich  
2003 Founded Ernst Ruska Centre  
2004 President and Vice-president, German Physical Society