Institute Lecture

High T_c Superconductivity – after A quarter Century A technology is ready to take off

Dr. J.Georg Bednorz
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Säumerstrasse 4, 8803 Rüschlikon, Switzerland

Tuesday, 17th June 2014, Time: 5.00 PM
Venue: Outreach Auditorium

Abstract

The scientific community just celebrated the centennial of the discovery of superconductivity and the 25th anniversary of the discovery of high-T_c superconductivity three years ago, and finally the field is ready to present a broad spectrum of large-scale applications. Many of these have been envisaged since the early days of superconductivity. However, only with the new cuprate superconductors and as a result of a concentrated, worldwide scientific and engineering effort with efficient international collaborations over the past two decades, does it now become possible – after one century – to finally realize these ideas. Specific segments in applications for power generation, transportation and network reliability are gaining attraction because of the increased importance of using renewable energy. Energy-efficient solutions for industrial processes are being provided by new and surprising concepts that led to the realization of the first commercial high-T_c superconductor products. Large-scale applications, which will need large quantities of superconducting wires, will however have to overcome the usual problems of a new technology – but superconductivity will definitively become a key technology for the 21st century.

About the speaker

J. Georg Bednorz was born in 1950 at Neuenkirchen, North Rhine-Westphalia, Germany. In 1968, Bednorz was enrolled at the University of Münster for studying chemistry but subsequently he opted to switch to the subject of crystallography. In 1972, he spent the summer at the IBM Zurich Research Laboratory as a visiting student. This summer experience at IBM Zurich greatly shaped his future career. After obtaining his Master's degree from Münster in 1977, Bednorz started his PhD at the ETH Zurich under the supervision of Heini Gränicher and K. Alex Müller.

In 1982, after obtaining his PhD, Bednorz joined the IBM Research Lab. In 1983, he and K. Alex Müller began a systematic investigation of the electrical properties of ceramic materials formed from transition metal oxides. In 1986, they succeeded in making a superconducting material lanthanum barium copper oxide with a critical temperature significantly higher than the previous record. This discovery soon stimulated a great deal of additional research in superconductivity worldwide and led to the discovery of many other compounds with even higher critical temperature. In 1987, Bednorz and Müller were jointly awarded the Nobel Prize in Physics "for their important break-through in the discovery of superconductivity in ceramic materials". Bednorz was appointed IBM Fellow in the same year. Currently, he holds the position of IBM Fellow Emeritus at IBM Research Lab - Zurich Switzerland.

In addition to the Nobel Prize in Physics, 1987, Dr. Bednorz has received many other awards and honors some of which include the Marcel-Benoist-Prize, 13th Fritz London Memorial Award of the University of California, Los Angeles, Dannie Heinemann Prize of the Academy of Sciences, Göttingen, Germany, Robert Wichard-Pohl Prize of German Physical Society, Otto-Klung Prize of Free University, Berlin, Germany, The Ross Coffin Purdy Award of American Ceramic Society, Hewlett-Packard Europhysics Prize, APS International Prize for New Materials Research of American Physical Society, Minnie Rosen Award of Ross University, New York. He is a Fellow of the American Physical Society, Honorary Member of the American Ceramic Society, Honorary Fellow of the Fudan University, Shanghai, China, and the Institute of Physics, Singapore. He was conferred Dr. honoris causa by the University of Regensburg, Germany, University of Salzburg, Austria, University of Silesia, Katowice, Poland and also by the University of Tbilisi, Georgia.

Tea at 4.45 PM **All interested are welcome.**

Amalendu Chandra
Dean of Research and Development