北京大学百年物理讲坛

Centennial Physics Lectures at Peking University

Lecture 25

Superconductivity: Where we are and where we are going

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Abstract

The discovery of superconductivity, the transmission of electrical current with zero energy loss, recently passed its 100th anniversary. This truly remarkable property of matter, found at cryogenic temperatures, has made its way into a variety of important uses in modern society, but nature has not yet given us the ultimate practical material that will change the world through its lossless transmission of electrical energy over long distances. Research on this complex problem in materials science persists in the world at many levels, and progress is continuously made on both scientific and practical fronts, in spite of the impatience that is often displayed by both the scientific and lay public, who typically prefer immediate rather than delayed gratification. In this talk I will briefly describe where we are in this field, and how we got here, and describe the vision that some have had for where we should be going. Because my personal research is in the discovery of new superconducting materials, only one facet among the larger set of fundamental and practical issues currently under study in superconductivity, the talk will be given from that perspective.

Biography

Robert J. Cava is a Russell Wellman Moore Professor of Chemistry at Princeton University. He received his Master's Degree in Materials Science and Engineering at MIT in 1974, and his Ph.D. Degree from MIT in 1978. He joined Princeton University as professor of Chemistry and Materials in 1996. He was Chair of Department of Chemistry at Princeton University in 2004-2010. His research emphasizes the relationships between chemistry, crystal structure, and electronic and magnetic properties of non-molecular solids. His research interest includes the study of the properties and materials chemistry of superconductors, magnetic materials, transparent electronic conductors, dielectrics, thermoelectrics, topological insulators, geometrically frustrated magnets, and correlated electron systems.

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