

Karl Alex Müller Biography

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Biography

Scientists have known about superconductivity--the tendency of a material to lose all resistance to the flow of an electric current--since 1911. For over sixty years, however, research on applications of this fascinating phenomenon developed only very slowly. One reason for this slow progress was that superconductivity was observed only at very low temperatures, within a few degrees of absolute zero. It was not clear, therefore, how practical applications of the phenomenon could easily be developed. In addition, scientists have not been able to produce superconductivity in the presence of even moderate magnetic fields. This behavior proved to be an especially difficult challenge since one potentially valuable application of superconductivity is in the development of magnets.

Between 1911 and about 1983, researchers had been able to increase the transition temperature (the temperature at which a material becomes superconductive) by less than 20°K , from about 4°K to about 23°K . Then, in 1986, two researchers at the IBM Research Division in Zurich accomplished a remarkable breakthrough. Karl Müller and German physicist Georg Bednorz (1950-) prepared a ceramic material made of a barium lanthanum copper oxide that became superconductive at 35°K . Within a year, other researchers found other ceramics with even higher transition temperatures: 48°K , 90°K , and even a reported 120°K . Müller and Bednorz's switch from metals to ceramics set off an explosive revolution in superconductive research.

Müller was born in Basel, Switzerland, on April 20, 1927. He earned his Ph.D. in physics at the Swiss Federal Institute of Technology in 1958. He worked for five years with the Batelle Institute in Geneva, and then became a research fellow at IBM in 1963. He has also served as lecturer and professor of physics at the University of Zurich.