

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**New research in Superconductivity** MONA KHORRAMI, Sanofi Groupe Co. — Superconductors are materials that have no resistance to electricity's flow; they are one of the last great frontiers of scientific discovery. The theories that explain superconductor behavior seem to be constantly under review. In 1911 superconductivity was first observed in mercury by Dutch physicist Heike Kamerlingh Onnes. When he cooled it to the temperature of liquid helium, 4 degrees Kelvin (-452F, -269C), its resistance suddenly disappeared. It was necessary for Onnes to come within 4 degrees of the coldest temperature that is theoretically attainable to witness the phenomenon of superconductivity. In 1933 German researchers Walther Meissner and Robert Ochsenfeld discovered that a superconducting material will repel a magnetic field. A magnet moving by a conductor induces currents in the conductor, but, in a superconductor the induced currents exactly mirror the field that would have otherwise penetrated the superconducting material - causing the magnet to be repulsed. This phenomenon is known as strong diamagnetism and is today often referred to as the "Meissner effect" (an eponym). Later on the theory developed by American physicists John Bardeen, Leon Cooper, and John Schrieffer together with extensions and refinements of the theory, which followed in the years after 1957, succeeded in explaining in considerable detail the properties of superconductors.

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Date submitted: 10 Dec 2012

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