BCS Theory of Superconductivity

Kolesova Nurguyaana MT8-42 Superconductivity is a phenomenon of exactly zero electrical resistance and expulsion of magnetic fields occurring in certain materials when cooled below a characteristic critical temperature.

Superconductivity was discovered in 1911 by Heike Kamerlingh Onnes

The complete, microscopic theory of superconductivity was finally proposed in 1957 by John Bardeen, Leon Cooper, and John Schrieffer. It came to be known as the BCS theory.



According to this theory, in a superconductor, electrostatic forces acting between positively charged ions of the metal crystal lattice, as well as the conduction electron, distort the lattice. After that, another electron is also affected: as a result, the current is transmitted not by individual electrons, but by coupled pairs of electrons, which are called Cooper

pairs. The grid is not affected by such a pair, and therefore it does not resist current.

For this work, the authors were awarded the Nobel Prize in 1972.

In 1959 Lev Gor'kov showed that the BCS theory becomes equivalent to the Ginzburg-Landau theory close to the critical temperature.

Thanks for attention