

New frontiers in superconductivity: Novel states and properties from topology and interfaces

Gertrud Zwicknagl, Institut fuer Mathematische Physik, TU Braunschweig, Germany

More than 100 years have passed since the discovery of superconductivity. In the meantime this fascinating phenomenon has provided the basis for a wide range of important applications. Our fundamental understanding of superconductivity has been based on the theory of Bardeen, Cooper, and Schrieffer known as BCS which was published in 1957.

Despite being a well-established field in quantum matter physics, superconductivity has been a continuous source of new discoveries during the past decade. The discoveries have been made possible by the progressive technical mastery of producing artificially structured quantum matter with tunable properties. Surfaces and interfaces play a key role in this context. On the theory side, "topology" emerged as a pervasive concept in characterizing and classifying novel states of quantum matter with fascinating and sometimes exotic properties.

In the present talk I will review some recent developments and ideas which may give rise to opportunities for scientific discovery and potential applications.