KONWERSATORIUM INSTYTUTU FIZYKI UMCS

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„The effect of spin-orbit interaction on bound states in superconductors”

It has long been known that magnetism and superconductivity are sworn enemies. There are however situations in which a local magnetic field, coming e.g. from the presence of impurities, can induce novel exotic phases in superconducting hosts. A classical magnetic impurity induces in-gap bound states, whose energy and topography depend on the coupling between the impurity and the superconductor, and on the properties of the superconductor itself. Large enough coupling can even induce a shift of the ground state of the system - a quantum phase transition. Spin-orbit coupling can affect virtually every aspect of such bound states (known in literature as Yu-Shiba-Rusinov states) and sometimes proves to be the necessary ingredient for engineering of topologically non-trivial phases. I will discuss the effect of different types of spin-orbit interactions - both intrinsic (induced by symmetry breaking or on the contrary, respecting the symmetries of the lattice) and extrinsic, i.e. induced by the presence of a substrate - on the Yu-Shiba-Rusinov states.

Uprzejmie zapraszam wszystkich pracowników, doktorantów i studentów Instytutu Fizyki.

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