Local electronic structure around an impurity in superconductor without an inversion center

B. Liu

Department of Physics, Beijing Jiaotong University, Beijing 100044, China

Recent discoveries of noncentrosymmetric superconductors have raised an interest in the theoretical investigation of superconductivity in these systems. Among interesting questions, the most important one is concerned with the underlying symmetry of the superconducting order parameter. We in this paper investigate theoretically the impurity resonance states where both s-wave and p-wave Cooper pairings coexist. Due to the nodal structure of gap function as a result of the interference between the spin-triplet and the spin-singlet components of the superconducting order parameters, we find that a single nonmagnetic impurity induced resonance state appears in the local density of state. In particular, we analyze the evolution of the local density of states for coexisting isotropic s-wave and p-wave superconducting states, and compare with that of anisotropic s-wave and p-wave symmetries of the superconducting gap. Our results show that the scanning tunneling microscopy can shed light on the particular structure of the superconducting gap in noncentrosymmetric superconductors.