Conductance spectroscopy of a strongly-correlated superconductor

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9.7 cm

We study theoretically the conductance of a two-dimensional junction between a normal metal and a *strongly-correlated* superconductor in Zeeman field. Depending on the field strength the superconductor is either in the Bardeen-Cooper-Schrieffer (BCS), or in the Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state of the Fulde-Ferrell type. The strong correlations are accounted for by means of the Gutzwiller approach, what leads naturally to the emergence of spin-dependent masses (SDM) of quasiparticles when the system is spin-polarized. The case without strong correlations (with spin-independent masses) is analyzed for comparison. We study both s-wave and d-wave symmetry of the superconducting gap and concentrate on the parallel orientation of the Cooper pair momentum $\mathbf{Q}$ with respect to the junction interface. The junction conductance is presented for a series of barrier strengths (i.e. in the contact, intermediate, and tunneling limits). The situation with strong correlations differs essentially from that in the non-correlated case. Our analysis provides thus an experimentally accessible *test for the presence of strong-correlations* in superconducting state.
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