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Conductance characteristics between a normal metal and a two-dimensional Fulde-Ferrell-Larkin-Ovchinnikov superconductor
QINGHONG CUI, Physics Department, Florida State University, CHIA-REN HU, Physics Department, Texas A&M University, J.Y.T. WEI, Physics Department, University of Toronto, KUN YANG, Physics Department, Florida State University — The Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state has received renewed interest recently due to the experimental indication of its presence in $CeCoIn_5$. In this work we explore the possibility of detecting the phase structure of the order parameter directly using conductance spectroscopy through micro-constrictions, which probes the phase sensitive surface Andreev bound states of d-wave superconductors. We employ the Blonder-Tinkham-Klapwijk formalism to calculate the conductance characteristics between a normal metal and a 2-dimensional s- or d-wave superconductor in the Fulde-Ferrell state, for all barrier parameter z from the point contact limit (z=0) to the tunneling limit (z$\gg$1). We find that the zero-bias conductance peak due to these surface Andreev bound states observed in the uniform d-wave superconductor is split and shifted in the Fulde-Ferrell state. This work was supported by NSF grant No. DMR-0225698, NSERC, CFI/OIT, MMO/OCE and CIAR. Reference: cond-mat/0510717.

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