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LOFF superconductivity in the proximity region of d-wave superconductor/ferromagnet tunneling junctions KWOK-WAI NG, MARIO FREAMAT, University of Kentucky — In the proximity region of superconductor-ferromagnet tunneling junctions, a signature of the Larkin-Ovchinnikov-Fulde-Ferrell (LOFF) state is the decaying oscillation of the LOFF order parameter with the distance from the junction barrier. Using N/I/F/$Bi_2Sr_2CaCu_2O_8$ (BSCCO) heterostructures, we investigated the dependence of this oscillatory behavior on the d-wave symmetry of the BSCCO superconductive order parameter. Two junctions were prepared on the same BSCCO crystal, in order to probe two different injection angles β in the ab-plane: one close to the nodal line direction (β=45°) and the other one close to the maximum gap direction (β=0). The tunneling spectra obtained on N/BSCCO junctions (i.e., no ferromagnetic layer) with the same orientation presented the usual features: high amplitude zero bias conductance peaks (ZBCP) for β=45° and V-shaped gaps for β=0. However, with a 70 Å thick antiferromagnetic interlayer (Fe), the N/I/F/BSCCO junctions show ZBCP for β=0 and gaps for β=45°. We attribute this opposite behavior to the presence of a spatially modulated LOFF order parameter in the Fe layer leading to flipped spectral characteristics at distances dependent on the ferromagnetic exchange energy. The diffusiveness of the structures is rather low, so that the oscillations for the nodal and antinodal injections are almost in antiphase.

Mario Freamat
University of Kentucky

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