Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Signatures of triplet supercurrents in hybrid S/F structures
CAROLINE RICHARD, MANUEL HOUZET, JULIA MEYER, SPSMS-CEA/UJF Grenoble, SPSMS-CEA/UJF GRENOBLE TEAM — While ferromagnetism and conventional superconductivity appear as antagonist phases, the proximity effect in hybrid S/F structures offers a unique opportunity to study their interplay. In particular, spin-triplet odd-frequency superconducting correlations may be induced in a diffusive ferromagnet. We study the Josephson effect through a long ferromagnetic bilayer in the diffusive regime [1]. For a non-collinear magnetization of the bilayer, we find that the current phase relation is dominated by its second harmonic, and corresponds to the long-range coherent propagation of two triplet pairs. Here, the superharmonicity is a signature of the Josephson coupling between a singlet superconductor and an effective triplet superconductor induced at the end of the ferromagnetic bilayer attached to the other lead. Then, we further study the critical current flowing between such two effective triplet reservoirs through a conventional superconducting layer. As a result of the competition between triplet/triplet and triplet/singlet couplings and under quite general conditions, we find that the critical current exhibits a maximum in the vicinity of the superconducting transition of the central layer. [1] C. Richard, M. Houzet, and J.S. Meyer, PRL. 110, 217004 (2013)

Caroline Richard
SPSMS-CEA/UJF Grenoble

Date submitted: 13 Nov 2013 Electronic form version 1.4