Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Ferromagnetic Josephson Resonance IVANA PETKOVIC, MARCO APRILI, Laboratoire de Physique des Solides, Univ. Paris-Sud, CNRS, UMR 8502, F-91405 Orsay Cedex, France — Ferromagnetic Josephson junctions with negative ($\pi-$) coupling behave as phase sources, a potentially very useful component of quantum electronics. In order to elaborate sophisticated circuits, it is crucial to understand the interplay between spin- and superconducting phase dynamics. For that purpose, we fabricated strongly underdamped sub-micron Josephson junctions. We measured the critical current at zero voltage as a function of the applied magnetic field. The finite magnetization in the junction induces a shift in the Fraunhofer pattern which is invariant under time reversal. For a voltage such that the Josephson frequency matches the ferromagnetic resonance, we observe a reduction of the critical current due to the absorption of the Josephson radiation by the ferromagnetic layer. We have investigated the effect of an external microwave radiation and of the magnetic field. The resonances appear as satellites at every Shapiro step and they are shifted in energy by the magnetic field as expected. The high sensitivity of the ac Josephson effect to a small amount of spins opens up new routes for ESR in nano-magnetism.

Ivana Petkovic
Laboratoire de Physique des Solides, Univ. Paris-Sud,
CNRS, UMR 8502, F-91405 Orsay Cedex, France

Date submitted: 27 Dec 2007 Electronic form version 1.4