

Superharmonic Josephson relation at 0 - π -junction transition

M. Houzet, V. Vinokur, and F. Pistolesi

Centre Nationale de la recherche and Argonne National Laboratory

Critical current was recently measured near the transition from 0 to π -contact in superconductor/ferromagnet/superconductor Josephson junctions. Contrary to expectations, it does not vanish at the transition point. It shows instead a tiny, though finite, minimum. The observation of fractional Shapiro steps reinforces the idea that the vanishing of the main sinusoidal term in the Josephson relation gives room to the next harmonics. Within quasiclassical approach we calculate the Josephson relation taking into account magnetic scattering. We find that the observed minimum is compatible with the value of the second harmonics expected from the theory.