Physical Review Letters 2006 vol.97 N5

Reentrant superconductivity in Nb/Cu1-xNix bilayers

Zdravkov V., Sidorenko A., Obermeier G., Gsell S., Schreck M., Müller C., Horn S., Tidecks R., Tagirov L.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

We report on the first observation of a pronounced reentrant superconductivity phenomenon in a superconductor/ferromagnet layered system. The results were obtained using a superconductor/ferromagnetic-alloy bilayer of Nb/Cu1-xNix. The superconducting transition temperature Tc drops sharply with increasing thickness dCuNi of the ferromagnetic layer, until complete suppression of superconductivity is observed at dCuNi≈4nm. Increasing the Cu1-xNix layer thickness further, superconductivity reappears at dCuNi≥13nm. Our experiments give evidence for the pairing function oscillations associated with a realization of the quasi-on--dimensional Fulde-Ferrell-Larkin- Ovchinnikov-like state in the ferromagnetic layer. © 2006 The American Physical Society.

http://dx.doi.org/10.1103/PhysRevLett.97.057004