

PS32

**RE-ENTRANCE SUPERCONDUCTIVITY IN NANOSTRUCTURES BASED ON Nb AND  
Cu-Ni – ALLOY LAYERS**

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An original vacuum technology for reliable and reproducible preparation of high quality nanostructures “superconductor /ferromagnet” (S/F) using magnetron sputtering is developed.

Superconducting properties of atomic smooth Nb/CuNi bilayers are investigated. The quality of the films was characterized by Auger-spectroscopy, AFM, TEM and SEM microscopy studies. The thickness of the layers and their composition was determined by the Rutherford backscattering spectrometry (RBS). For specimens with constant Nb layer thickness we observed distinct oscillations of the superconducting critical temperature till the re-entrant behavior upon increasing the thickness of the CuNi layer. The results are interpreted in terms of Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) like inhomogeneous superconducting pairing in the ferromagnetic CuNi layer.

The obtained results can be used for superconducting electronics and spintronics.

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