

IFMBE Proceedings

Volume 77, 2020, Pages 19-22

4th International Conference on Nanotechnologies and Biomedical Engineering, ICNBME 2019; Chisinau; Moldova; 18 September 2019 through 21 September 2019; Code 232319

- Muntyanu, F.M.,
 - Nenkov, K.,
 - Zaleski, A.J.,
 - Chistol, V.
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- Institute of Electronic Engineering and Nanotechnologies, 3/3, Academiei Street, Chisinau, Moldova
 - Leibniz-Institut für Festkörper und Werkstofforschung, Dresden, Germany
 - Institute of Low Temperatures and Structural Research, Polish Academy of Sciences, Wrocław, Poland
 - Technical University of Moldova, Chisinau, Moldova

DOI: 10.1007/978-3-030-31866-6_4

Superconductivity and weak ferromagnetism in inclination bicrystal interfaces of bismuth and antimony

Abstract

Using Quantum Design SQUID magnetometer and Physical Property Measuring System (PPMS), we studied the magnetic and superconducting properties of high-quality inclination crystallite interfaces (CIs) of bicrystals of Sb and Bi. It was found that the CIs with a higher carrier density than single crystalline samples exhibit a superconducting transition with respectively $T_c \leq 10$ K for Sb and $T_c \leq 21$ K for Bi interfaces; the Sb CIs also

manifest ferromagnetic hysteresis loops against a paramagnetic background, thereby indicating occurrence of superconductivity and weak ferromagnetism.