PECULIARITIES IN THE QUANTUM TRANSPORT AT THE INTERFACES OF BISMUTH-ANTIMONY BICRYSTALS

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As a result of the study of the magnetic and superconducting properties of tilt-type crystallite interfaces in bismuth-antimony bicrystals were detected some properties unusual for their similar bulk semiconductors.

A comprehensive study was carried out on the bicrystals with nanoscale multilayer interfaces, where superconductivity (Tc ≤ 21K) is exhibited separately or simultaneously with weak ferromagnetism.

Magnetotransport anomalies identified in magnetic field transport manifest themselves in the Hall effect, longitudinal magnetoresistance and Seebeck effect. Behaviour of the Seebeck coefficient and magnetoresistance peculiarities indicate the occurrence of a new small group of the electrons; thermomagnetic phenomena in crystallite interfaces layers exhibit behavior of the 3D topological semimetals, whereas in semiconductor bulk bicrystals they manifest typical features of the 3D topological insulators. Both phenomena indicate to the electronic phase transitions of the semiconductor-semimetal type in magnetic field.

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