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Peculiarity of High-Field Galvanomagnetic Effects in Bicrystals of Bi and its Alloys with Sb

E. M. Muntyanu^{1, 2}, A. Gilewski², V. Chistol⁴ and K. Rogacki^{2,3}

¹*Institute of Electronic Engineering and Industrial Technologies, Academy of Sciences of Moldova, Chisinau, Moldova*

²*International Laboratory of High Magnetic Fields and Low Temperatures, Wroclaw, Poland*

³*Institute of Low Temperatures and Structural Research, Polish Academy of Sciences, Wroclaw, Poland*

⁴*Technical University of Moldova, Chisinau, Moldova*

We present the results of investigation of high-field (up to 40 T) galvanomagnetic effects in bicrystals of semimetallic Bi and 3D topological insulator $\text{Bi}_{1-x}\text{Sb}_x$ ($0.07 < x < 0.22$) with nano-width crystallite interfaces (~ 100 nm). At $B > 2$ T directed along the interface plane in the quantum oscillations spectrum of Bi and Bi-Sb bicrystals, two new harmonics have been detected. Their periods of oscillation characterize the much larger cross-sectional areas of Fermi surface of charge carriers than it is in single crystalline specimens. In small disorientation angle Bi bicrystals of an inclination type, a number of Hall quasi-plateaus were observed, which vanish by reversing the magnetic field. It has been also found that in bicrystals of Bi-Sb with small crystallite disorientation angle, the semiconductor-semimetal transition is induced in crystallites and interface layers at different values of magnetic field.