



High-field peculiarities of galvanomagnetic quantum oscillations in Bi bicrystals with nano-width superconducting crystallite interfaces

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Abstract

We present the result of high-field (up to 40T) galvanomagnetic study of bismuth bicrystals with nano-width crystallite interfaces ($\sim 100\text{nm}$). At $B > 2\text{T}$ directed along the interface plane in the quantum oscillations spectrum of the longitudinal Hall effect, two new harmonics have been detected. Their periods of oscillation characterise the much larger cross-sectional areas of Fermi surface of charge carriers than it is in single crystalline bismuth. At the same time, in small disorientation angle bicrystals of an inclination type, a number of Hall quasi-plateaus were observed, which vanish by reversing the magnetic field. We conclude that in bicrystals there are spin-oriented carriers that are located in spectrum of Landau levels at the particular orientation of the magnetic field.