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Title: Thermomagnetic transport due to the superconducting interfaces in inclination bicrystals of Bi

Abstract
The group- V semimetals are of major interest for solid state physics, because of easy access to the quantum limit in high magnetic fields and possibility of studying the unusual behavior of Dirac electrons under extremal conditions of a strong phonon drag effect, electronic topological phase transitions, and proximity-induced superconducting order. Some of these materials like Bi, exhibit remarkable electron transport properties and unique thermoelectric and thermomagnetic characteristics, defining new directions in this field of science. In this report we show the high - field thermomagnetic power $S_{ii}(B)$ and Nernst–Ettingshausen effect $S_{ij}(B)$ in Bi inclination bicrystals with superconducting nano-width interfaces (~ 100 nm). We found that the thermomagnetic effects in small disorientation angle bicrystals (SDA) are considerably higher than in single crystalline Bi and large disorientation angle (LDA) samples. A weak increase of the monotonic $S_{ii}(B)$ in SDA bicrystals and completely saturated thermomagnetic power in LDA specimens were detected, indicating a varying contribution of thermally excited carriers and a different degrees of interface disorder. It was also revealed that the maximum of temperature dependences of $S_{ii}(B)$ quantum oscillation amplitude in SDA bicrystals is shifted ~ 1 K at low temperatures, compared to Bi single crystals. Two new quantum oscillation harmonics we have found in quantizing magnetic fields, characterizing different densities of electronic states and different levels of disorder both in LDA and in SDA interfaces. It should be assumed that the obtained results are important for future applications in thermoelectricity and spintronic devices.
Key words: bicrystals, crystallite interfaces, bismuth, superconductivity

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