

F.M.Muntyanu <sup>a</sup>

V.Chistol <sup>b</sup>

a

Institute of Electronic Engineering and Nanotechnologies, Chisinau, 2028, Republic of Moldova

b

Technical University of Moldova, Chisinau, 2004, Republic of Moldova

## Features of thermomagnetic transport due to the superconducting interfaces in inclination bicrystals of Bi and 3D topological insulator $\text{Bi}_{1-x}\text{Sb}_x$

<https://doi.org/10.1016/j.physb.2019.05.032>

### Abstract

We studied the thermomagnetic power  $S_{ii}(B)$  and Nernst–Ettingshausen effect  $S_{ij}(B)$  in inclination bicrystals of Bi and 3D topological insulator  $\text{Bi}_{1-x}\text{Sb}_x$  ( $0.04 < x \leq 0.12$ ) with superconducting nano-width interfaces ( $T_c \leq 21$  K). High values of thermomagnetic effects in small disorientation angle (SDA) bicrystals far exceeding values in single-crystalline samples were found. It was established that  $S_{ii}(B)$  linearly increases in high fields without saturation and change the sign from negative in positive in bicrystals of 3D Dirac point forming ( $x \sim 0.04$ ), specifying the signature of 3D topological semimetal. Contrarily,  $S_{ii}(B)$  in LDA bicrystals with  $0.06 \leq x \leq 0.12$  undergoes

**saturation or increases smoothly, the Landau level index depends linearly on  $1/B_n$ , and extrapolate to  $-0.5$  if  $1/B_n \rightarrow 0$ , what is typical for the 3D topological insulators. Two new quantum oscillation harmonics are revealed in high fields; they characterize different densities of electronic states and different levels of disorder at LDA and SDA interfaces.**