



# Evolution of superconductivity and weak magnetism in inclination interfaces of Bi, Sb and $\text{Bi}_{1-x}\text{Sb}_x$ ( $0.07 \leq x \leq 0.2$ ) alloys

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## Abstract

Using Quantum Design SQUID magnetometer, we studied the magnetic and superconducting properties of high quality inclination bicrystal interfaces of Bi, Sb and 3D topological insulator  $\text{Bi}_{1-x}\text{Sb}_x$  ( $0.06 \leq x \leq 0.2$ ). One or two superconducting phases with  $T_c \leq 21$  K and magnetic hysteresis loops on a diamagnetic background typical for strong type II superconductors were identified in Bi and some Bi-Sb nano-width interfaces. However, the other interfaces of  $\text{Bi}_{1-x}\text{Sb}_x$  ( $0.06 \leq x \leq 0.2$ ) as well as of Sb with a higher carrier density exhibit a superconducting transition and a ferromagnetic hysteresis loop or a dual loop (superimposed ferromagnetic and superconducting loops) against a paramagnetic background and thereby indicate the occurrence of superconductivity and weak ferromagnetism.