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Superconductivity and Weak Ferromagnetism in Inclination Bicrystal Interfaces of Bismuth and Antimony

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Using Quantum Design SQUID magnetometer and Physical Property Measuring System (PPMS), we studied the magnetic and superconducting properties of high-quality inclination crystallite interfaces (CIs) of bicrystals of Sb and Bi. It was found that the CIs with a higher carrier density than single crystalline samples exhibit a superconducting transition with respectively $T_c \leq 10$ K for Sb and $T_c \leq 21$ K for Bi interfaces; the Sb CIs also manifest ferromagnetic hysteresis loops against a paramagnetic background, thereby indicating occurrence of superconductivity and weak ferromagnetism.