

Complex spin dynamics induced metamagnetic transitions in topological semimetal EuAuBi

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In recent years, quantum materials coupled with magnetism have attracted significant attention due to their topological states and ability to tune them via spin degree of freedom for next-generation topo-spintronic applications. In this work, we present the Eu-based ternary compound EuAuBi, identified as a topological semimetal through DFT calculations. The single crystal of EuAuBi were grown using the flux-method. The system is anisotropic and displays three distinct magnetic phases at 4 K (T_{N1}), 3.5 K (T_{N2}), and 2.8 K (T_{N3}) as observed from magnetic and specific heat measurements. Field-dependent ac and dc magnetization measurements uncover field-induced non-trivial spin textures in the magnetic field range 1.5 to 3 T, manifested as a tilted plateau in the magnetization curves. The interplay between conduction carriers and these spin textures is further evidenced by unique features in the magnetic field-dependent longitudinal resistivity in the system. In addition, an extra contribution consistent with the topological Hall effect is also observed in similar field- and temperature regions. Based on these results, we present a comprehensive magnetic phase diagram of EuAuBi, revealing multiple field-induced spin configurations. These findings establish EuAuBi as a rare material system in which both momentum-space and real-space Berry curvature effects may coexist, offering an opportunity to investigate their interplay.

References:

[1] Lipika, Shobha Singh, Anyesh Saraswati et al, Physical review B, 2026. <https://doi.org/10.1103/dt26-56xc>