

Investigating Magnetic Properties of Mn-Deposited Bi/Ag(111) with Spin-polarized Scanning Tunneling Microscopy

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The emergence of two-dimensional topological materials and spontaneous magnetization holds the potential for the realization of the quantum anomalous Hall effect. In this research, we employ spin-polarized scanning tunneling microscopy (SP-STM) to investigate the structural and magnetic characteristics of manganese (Mn) deposition on the Bi/Ag(111) surface. The deposition of Mn on Bi/Ag(111) gives rise to the formation of a remarkable honeycomb lattice structure. Field-dependent SP-STM measurements have unveiled magnetic signals exhibiting a 2×2 periodicity. We propose that these magnetic signals originate from close-packed Mn beneath the Bi honeycomb layer. Our SP-STM simulations reveal that the magnetic contrast pattern closely resembles the triple-q spin state, and we can reproduce this pattern in simulation by adjusting the orientation of the tip to a specific angle.

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