

# Resolving Atomic-Scale Complex Magnetic Order in an Antiferromagnetic Ultrathin Film by Spin-polarized Scanning Tunneling Microscopy

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Antiferromagnets are crucial in fundamental research and spintronic applications. According to Gao et al., the noncollinear antiferromagnetic structure was observed in Mn monolayer on Ag(111). In this work, we have systematically studied the strain-tailored noncollinear spin structures in the Mn bilayer on Ag(111) by using spin-polarized scanning tunneling microscopy and DFT calculations. Interestingly, two crystalline structures have been found on the Mn bilayer, and they show different magnetic spin textures. The first one is pseudomorphic phase with a conical spin spiral state, the second one is reconstructed phase with a cycloidal spin spiral state. The DFT calculations provide further detailed theoretical insights on how these complex magnetic orders affected by a uniaxial strain relief.

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