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Tunable negative magnetoresistance in hydrogenated graphene[1]
SHI-MIN CAO, CHAO-YI CAI, CHUAN-WU CAO, JIAN-HAO CHEN, International Center for Quantum Materials, School of Physics, Peking University, and Collaborative Innovation Center of Quantum Matter, Beijing 10087 — The problem of unconventional magnetism in materials without d and f electrons has attracted continuous attention. In particular, a lot of efforts have been devoted to understand the origin and effects of magnetic moments induced in graphene with structure defects such as missing carbon atoms, absorption of light atoms such as hydrogen or fluorine. We have measured the magnetoresistance (MR) of graphene at low temperature with in-situ hydrogenation in ultra-high vacuum environment. Large negative MR was found in hydrogenated graphene which could be tuned by carrier density and sample temperature. Depending on the density of absorbed atomic hydrogen and carrier density, large linear negative MR was found which did not saturate up to 9 Tesla. Such negative MR could be the manifestation of local moments created by atomic hydrogen absorbed on graphene.

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