

Abstract Submitted
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Epitaxial graphene on SiC(0001): More than just honeycombs L. LI, University of Wisconsin, Milwaukee, WI 53211, Y. QI, R.H. RHIM, G.F. SUN, M. WEINERT — Combining scanning tunneling microscopy using transition-metal (Fe, Cr)-coated W tips and first-principles calculations, we show that the interface of epitaxial graphene/SiC(0001) is a warped graphene layer with periodic inclusions of hexagon-pentagon-heptagon ($H_{5,6,7}$) defects [1]. These defects break the six-fold honeycomb symmetry, thereby inducing a gap and two states below E_F near the Dirac point. Furthermore, we show that the next graphene layer assumes the perfect honeycomb lattice, but its interaction with the warped interfacial layer modifies the linear dispersion about the Dirac point, leading to parabolic dispersion and an apparent gap of ~ 0.25 eV. These results explain recent angle-resolved photoemission and carbon core-level shift data, and resolve the long-standing issue of the interfacial structure of epitaxial graphene on SiC(0001).

[1] Qi et al., Phys. Rev. Lett. **105**, 085502 (2010).

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