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Hidden Kekule Order of Ghost Atoms on Monolayer Graphene CHRISTOPHER GUTIERREZ, Columbia University, LOLA BROWN, EDWARD LOCHOCKI, Cornell University, ETHAN ROSENTHAL, Columbia University, CHEOL-JOO KIM, YUI OGAWA, KYLE SHEN, JIWOONG PARK, Cornell University, ABHAY PASUPATHY, Columbia University — Various charge and spin ordered phases have been predicted to exist in graphene when the lattice symmetry is broken on the atomic scale. One such phase is the Kekule distortion, whereby the C-C bond symmetry is broken and the graphene unit cell is tripled. It has been proposed that when certain adatoms are placed on monolayer graphene, strong interactions can exist between them mediated by the graphene lattice. The grapheneadatom interaction can induce Kekule order in the graphene itself, and move the adatoms to produce a hidden Kekule ordering. In this talk I will discuss evidence from scanning tunneling microscopy, electron diffraction and angle resolved photoemission spectroscopy that shows the existence of this unique ordering in epitaxial graphene on copper. Interestingly, we find in this case that the Kekule order is induced by a dilute number of "ghost atoms" – unidentified atomic features – in the otherwise perfect copper lattice underneath monolayer graphene.

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