Abstract Submitted
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Dispersion Forces of Adatoms on Deformed Graphene[1] VALERI KOTOV, University of Vermont — van der Waals (vdW) forces are especially important near atomically-thin materials, such as graphene, boron nitride (h-BN) and transition metal dichalcogenides (e.g. MoSe2), which form the building blocks of the so-called van der Waals heterostructures. These systems can also exhibit strong deformations in their structure due to stress, either applied externally, or induced by the presence of a substrate. A problem of fundamental and technological importance is how the vdW forces, which reflect Coulomb interactions and polarization effects, depend on electronic and mechanical material properties. I will show that strain fields can greatly enhance the vdW interactions of neutral adatoms near graphene and structurally similar surfaces, thus substantially affecting adsorption properties and altering the dissipative dynamics associated with atomic motion. For the case of two strained graphene sheets similar enhancement was predicted by A. Sharma et.al., PRB 89, 235425 (2014). I will consider several aspects of the adatom-graphene problem: (1) Variation of the vdW force as a function of uniaxial and more general strain fields, (2) Dependence on electron-electron interactions, including renormalization effects near the Dirac point, (3) Implications for dissipative atom dynamics.

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