

Abstract Submitted
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Rippling of Graphene¹ MARIA MOURA, UT Austin Physics Department, REBECCA THOMPSON-FLAGG, APS PhysicsCentral, MICHAEL MARDER, UT Austin Physics Department — Experiments found that free standing, single-layer graphene sheets display ripples [1]. Here we show that graphene can develop ripples as a consequence of adsorbed molecules sitting on random sites. The adsorbates cause the bonds between the carbon atoms to lengthen slightly. Static buckles then result from a mechanism like the one that leads to buckling of leaves. Ripples caused by roughly 20% coverage of adsorbates are consistent with experimental observation. We show why this mechanism is more likely to explain ripples than are thermal fluctuations or the Mermin-Wagner theorem (previously invoked [2]). This work was recently published [3].

[1] J. C. Meyer, A. K. Geim, M. I. Katsnelson, K. S. Novoselov, T. J. Booth, and S. Roth, *Nature*, 446, 60 (2007).

[2] A. Fasolino, J. H. Los, and M. I. Katsnelson, *Nature Materials*, 6, 858, (2007).

[3] R. Thompson-Flagg, M. J. B. Moura, and M. Marder, *EPL*, 85, 46002 (2009).

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