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The Graphene Phonon Dispersion and Thermally Induced Ripples: A quantitative atomistic treatment JOSHUA PETRUS, DONALD PRIOUR, Youngstown State University — We develop a quantitatively correct atomistic model for graphene which takes into consideration bond stretching and bond bending energies; unknown parameters are determined using a least squares fit to phonon dispersion curves gleaned from experiment. In the context of our model, we consider lattice distortions to harmonic order and we calculate the root mean square displacements from equilibrium as a function of system size and temperature. We confirm the analytical results in the harmonic approximation with numerical results from Monte Carlo calculations.

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