1035-74-612 **J. Gallagher**, Department of Physics, Rochester Institute of Technology, Rochester, NY 14623, **Y. Milman**, Department of Mathematics, The City College of New York, New York, NY 10031, **S. Ryan*** (sdr17@uakron.edu), Department of Applied Mathematics, The University of Akron, Akron, OH 44325, **D. Golovaty**, Department of Applied Mathematics, The University of Akron, Akron, OH 44325, **J. P. Wilber**, Department of Applied Mathematics, The University of Akron, Akron, OH 44325, and **A. Buldum**, Department of Physics, The University of Akron, Akron, OH 44325. *A Buckling Problem for Graphene Sheets.*

We develop a continuum model that describes the elastic bending of a graphene sheet interacting with a rigid substrate by van der Waals forces. Using this model, we study a buckling problem for a graphene sheet perpendicular to a substrate. After identifying a trivial branch, we combine analysis and computation to determine the stability and bifurcations of solutions along this branch. Also presented are the results of atomistic simulations. The simulations agree qualitatively with the predictions of our continuum model but also suggest the importance, for some problems, of developing a continuum description of the van der Waals interaction that incorporates information on atomic positions. (Received September 12, 2007)