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Molecular dynamics study of contact mechanics: contact area and interfacial separation from small to full contact CHUNYAN YANG, BO PERSSON, IFF, FZ-Juelich, D-52425, Germany — We report a molecular dynamics study of the contact between a rigid solid with a randomly rough surface and an elastic block with a flat surface. We study the contact area and the interfacial separation from small contact (low load) to full contact (high load). For small load the contact area varies linearly with the load and the interfacial separation depends logarithmically on the load [1-4]. For high load the contact area approaches to the nominal contact area (i.e., complete contact), and the interfacial separation approaches to zero. The present results may be very important for soft solids, e.g., rubber, or for very smooth surfaces, where complete contact can be reached at moderate high loads without plastic deformation of the solids.

References:

- [1] C. Yang and B.N.J. Persson, arXiv:0710.0276, (to appear in Phys. Rev. Lett.)
- [2] B.N.J. Persson, Phys. Rev. Lett. 99, 125502 (2007)
- [3] L. Pei, S. Hyun, J.F. Molinari and M.O. Robbins, J. Mech. Phys. Sol. 53, 2385 (2005)
- [4] M. Benz, K.J. Rosenberg, E.J. Kramer and J.N. Israelachvili, J. Phy. Chem. B.110, 11884 (2006)

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