

Abstract Submitted
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Short-Range Exponential Repulsive Force Between Randomly Rough Surfaces KENNETH ROSENBERG, Dept. of Physics, University of California, Santa Barbara, MARCEL BENZ, JACOB ISRAELACHVILI, Dept. of Chem. Eng, University of California, Santa Barbara — Using a Surface Forces Apparatus we have studied the effects of surface roughness on the interaction forces and deformations of polymeric surfaces. We measured the force-distance functions on approach and separation of two rough surfaces which, on approach, exhibited an almost perfect exponentially repulsive force-distance regime, and a weak adhesion on separation. Random roughness may be a prerequisite for the exponential force regime, which appears to be due to the local compressions (micro- or fine- grained deformations) of the surface asperities. The resulting characteristic decay lengths were fitted to common surface roughness parameters obtained by Atomic Force Microscopy to draw possible correlations. The coarse-grained (global) deformations of the initially curved surfaces appear to be Hertzian.

Kenneth Rosenberg
Dept. of Physics, University of California, Santa Barbara

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