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**Experimental Measurement of Elastic Contact Diameter**
CHARLES YING, NIST — Manipulation of nano-objects, as well as further development of the MEMS technology, needs an understanding and control of surface forces, including friction and adhesion forces, which depend on contact area in the nanoscale. Meaningful measurements of surface forces and correct interpretation of the force data require knowledge of contact area. Due to experimental difficulties of contact area measurements, a common practice today in surface force research using atomic force microscopy (AFM) is to compute the contact area using the contact mechanics theories. In this talk, I will present a method of experimental determination of contact diameter, or contact width, between a diamond tip and a flat silicon surface. The experiments used diamond tips with their surface geometry determined by AFM imaging. The measured elastic contact widths for diamond tips with a spherical shape, under controlled magnitudes of force in the surface normal direction, agree with the Hertzian contact mechanism. The technique has also been used successfully to obtain contact widths for non-spherical tip geometry.

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