

Abstract Submitted  
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**Measurements of Bond Breaking Forces in Single Atom Contacts and Single Molecule Junctions**<sup>1</sup> SRIHARSHA ARADHYA, MICHAEL FREI, LATHA VENKATARAMAN, Columbia University — We measure the force required to break a single-atom Au-point contact formed between the tip of a gold-coated micro-cantilever and a gold substrate using a modified conducting atomic force microscope (AFM) while simultaneously measuring the conductance of the contact. Repeated measurements are performed to study the distributions and average forces required to break a single gold-gold bond as a function of the speed at which the surface is separated from the cantilever. Experimental results are compared to existing theoretical models, which predict non-Gaussian asymmetric distributions of breaking forces, to obtain microscopic parameters of the adhesive potential. These techniques are then applied to analyze the force data acquired while breaking single metal-molecule-metal junctions. In addition, an alternative approach involving application of constant pulling force on the junction through feedback control loop is explored.

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