Control of Friction at the Atomic Scale

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We will discuss techniques to control friction at the atomic scale, during sliding. The experiments involve an AFM tip sliding on a vibrating surface mounted on a piezo-element. Our theoretical/numerical results are focused on development of efficient algorithms to control friction towards targeted behaviors. We will discuss a terminal attractor algorithm to control frictional dynamics of an array of particles towards pre-assigned values of the frictional force. This control technique is robust and significantly reduces the transient time to reach the prescribed behavior. Only the average sliding velocity of the array is needed in order to apply the proposed control.

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