

Abstract Submitted
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Onset of Sliding in Single Asperity Contacts¹ VINCENT LIGNERES, MARK ROBBINS, Johns Hopkins University — Continuum models of friction often assume that sliding initiates at the edge of a contact, and gradually spreads across the contact. However these partial slip models make simple assumptions about friction laws and must break down at atomic scales. Molecular dynamics simulations are used to analyze the nature of atomistic effects and the variation of partial slip with length scale. In continuum theory there are singularities in tangential force at the edge of the contact that initiate slip. The discrete spacing between atoms and interfacial elasticity reduce these singularities in small contacts. Elastic coupling within the contact also limits partial slip and favors coherent slip across the interface. The variation of these effects with length scale, atomic geometry and the presence of adsorbed monolayers is described.

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