



Effects of asperity contact on stick-slip dynamics

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It is believed that asperity contact plays an important role in friction, in particular in onset of dynamic slip or stick-slip motions. However, there remains very few studies controlling asperities and observing their effects on macroscopic stick-slip behavior or frictional constitutive laws. Here we perform stick-slip friction experiments between compliant gels with well-controlled asperity shape/size/configurations by molding technique. We find that, as curvature radius of the asperity becomes larger and the normal stress becomes smaller, velocity dependence turns from rate-strengthening to rate-weakening and accordingly, frictional behavior transitions from steady sliding, slow slip to fast slip. In this talk, we discuss the asperity size effects based on microscopic/macroscopic observations as well as a theoretical argument.