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**The drop impact dynamics of complex fluids on textured surfaces**  
KYOO-CHUL PARK, VIVEK SHARMA, ROBERT COHEN, GARETH MCKINLEY, Massachusetts Institute of Technology — The deposition of aqueous drops on non-wetting surfaces is an important canonical problem for many applications, including suppressing splash or rebound of sprayed herbicides on intrinsically hydrophobic plant leaves. The addition of a small amount of high molecular weight polymer has been demonstrated to suppress drop rebound on smooth hydrophobic surfaces. The high extensional viscosity of polymer solutions and the increased viscous dissipation near the receding contact line are cited as two distinct anti-rebound mechanisms. Using drop impact experiments on both micro- and nano-textured surfaces with controlled wetting characteristics we examine the roles of viscosity, elasticity and inertia on expansion, retraction, and rebound of well-characterized viscoelastic fluids. By adopting a stick-slip flow model on textured surfaces with various topographic length scales and solid area fractions, we rationalize the dynamics leading to complete rebound following drop impact on nanotextured surfaces even for highly viscoelastic fluids.

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