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Its harder to splash on soft solids[1] SAM HOWISON, Mathematical Institute, Oxford University, CHRISTOPHER HOWLAND, Trinity College, Oxford University, ARNAUD ANTKOWIAK, Institut Jean Le Rond dAlembert, Sorbonne University, RAFAEL CASTREJON-PITA, School of Engineering and Materials Science, Queen Mary, University of London, JAMES OLIVER, ROBERT STYLE, Mathematical Institute, Oxford University, ALFONSO CASTREJON-PITA, Department of Engineering Science, University of Oxford — Droplets splash when they impact dry, flat substrates above a critical velocity that depends on parameters such as droplet size, viscosity and air pressure. By imaging ethanol drops impacting silicone gels of different stiffnesses we show that substrate stiffness also affects the splashing thresh- old. Splashing is reduced or even eliminated: droplets on the softest substrates need over 70more kinetic energy to splash than they do on rigid substrates. We show that this is due to energy losses caused by deformations of soft substrates during the first few microseconds of impact. We find that solids with Youngs moduli ¡ 100kPa reduce splashing, in agreement with simple scaling arguments. Thus materials like soft gels and elastomers can be used as simple coatings for effective splash prevention. Soft substrates also serve as a useful system for testing splash-formation theories and sheet-ejection mechanisms, as they allow the characteristics of ejection sheets to be controlled independently of the bulk impact dynamics of droplets.

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