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Non-Newtonian Impact DENIS BARTOLO, Laboratoire PMMH (CNRS UMR 7636, ESPCI, P6, P7), GREGOIRE NARCY, LPS de l'ENS (CNRS UMR 8550, P6, P7), DANIEL BONN, LPS de l'ENS (CNRS UMR 8550, P6, P7) and Van der Waals-Zeeman institute, Univ. of Amsterdam. — Spray deposition is widely used in industry (spray painting, pesticide spraying...), but is often inefficient due to an unfavourable wetting interaction of the liquid with the surface. Non-Newtonian polymer effects have been suggested to improve the deposition efficiency, but so far the mechanism has remained elusive and controversial. Here we provide the detailed and quantitative mechanism of the action of the polymers, opening the way to use the non-Newtonian properties to control deposition. We study the impact and subsequent retraction of aqueous drops onto a hydrophobic surface for which rebound of the droplets limits deposition. Adding very small amounts of large molecular weight, flexible polymers dramatically slows down the retraction, inhibiting rebound. We show that the polymers generate strong normal stress effects near the moving contact line of the drop; these can be measured in conventional rheology and can be used to quantitatively account for the slowing down of the retraction.

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