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Three-dimensional blade coating of complex fluid VACHITAR SINGH, EMMA GRIMALDI, NYU Polytechnic School of Engineering, ALBAN SAURET , SVI, CNRS/Saint-Gobain, EMILIE DRESSAIRE, NYU Polytechnic School of Engineering — The application of a layer of non-newtonian fluid on a solid substrate is an important industrial problem involved in polymer or paint coatings, and an everyday life challenge when it comes to spreading peanut butter on a toast. Most experimental and theoretical work has focused on the two-dimensional situation, i.e. the scraping of a fixed blade on a moving substrate to turn a thick layer of liquid into a thin coat. However the spreading of a finite volume of non-newtonian fluid using a blade has received less attention, despite significant practical and fundamental implications. In this study, we investigate experimentally the spreading of a finite volume of a model non-newtonian fluid, carbopol, initially deposited against the fixed blade. As the substrate is translated at constant speed, we characterize the dynamics of spreading and the final shape of the coated layer. We measure and rationalize the influence of the liquid volume, the height and orientation of the blade, and the speed of the substrate on the spreading.

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