Abstract Submitted
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Drop impact of extensible yield-stress fluids[1] SAMYA SEN, RANDY H EWOLDT, University of Illinois at Urbana-Champaign — We study the role of extensional rheology on the impact behavior of drops of elastoviscoplastic fluids on thin films, showing that a recently proposed and successful dimensionless group for viscoplastic fluids fails to predict impact regimes when elastic extensional effects are significant. We do this by creating a new formulation for an extensible yield-stress fluid in which extensional properties vary dramatically. The non-Newtonian fluid is an aqueous suspension of Carbopol microgel particles (a well-studied system) with the addition of high molecular weight poly(ethylene oxide) (PEO) at varying concentration. The fluids fit into the new paradigm of extensible yield-stress fluids [1]. Drop impacts onto substrates coated with the same material are recorded using high-speed cameras, and different impact regimes are identified as a function of droplet size, velocity, coating thickness, and droplet rheology. Whereas the previous dimensionless group only involves steady shear rheological properties (yield stress and Bingham plastic viscosity), we consider additional modification to account for the elastic extensional effects. [1] Nelson, A.Z., R.E. Bras, J. Liu, and R.H. Ewoldt, "Extending yield-stress fluid paradigms", *J. Rheol.* **62**, 357 (2018)

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Samya Sen
University of Illinois at Urbana-Champaign

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