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Dynamic shear fronts in dense suspensions ENDAO HAN, University of Chicago, MATTHIEU WYART, Ecole Polytechnique Federale de Lausanne (EPFL), IVO PETERS, University of Southampton, HEINRICH JAEGER, University of Chicago — Dense suspensions are fluid-like when perturbed gently, but they are able to turn into a solid under impact, shear, or extension. Previous work has shown that this dynamic solidification is related to a rapidly propagating shear front. To better understand these phenomena, we extended the phenomenological model developed by Wyart and Cates (PRL, 2014), which explains shear thickening and shear jamming of dense suspensions in the steady state, and applied the new model to a one-dimensional system that undergoes simple shear starting from rest, i.e., includes a transient state. We designed a quasi-one-dimensional experiment to test the numerical results given by the model. Both the calculations and the experiments show that the applied strain is the key parameter that needs to be considered when extending the steady-state behavior to include the transient response of the system.

Endao Han
University of Chicago

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