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Dynamically Jammed Fronts under impact in shear thickening suspensions SHOMEEK MUKHOPDHYAY, BENJAMIN ALLEN, LUCIA KORPAS, ERIC BROWN, Department of Mechanical Engineering, Yale University — Shear thickening fluids such as cornstarch and water show remarkable impact response allowing, for example, a person to run on the surface but sinking at lower velocities. We perform constant velocity impact experiments and imaging in shear thickening fluids at velocities lower than 500 mm/s and suspension heights of a few cm. In this regime where inertial effects are insignificant, we discover the existence of two dynamically jammed fronts which reach the opposite boundary to support large stresses like a solid. These stresses are large enough to support the weight of a running person. We also find a shear thickening transition under impact which is due to collision of the fronts with the boundary. The jammed front show similarities to granular materials like localization of stress. There is a critical velocity required to generate these impact activated fronts.

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