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To jam or not to jam? SRISHTI ARORA, MICHELLE DRISCOLL , Northwestern University — The extraordinary hydrodynamic phenomenon of drop impact has inspired numerous studies exploring a variety of Newtonian and complex fluids. Although this is a century-old problem, there are only a few studies on the impact dynamics of colloidal suspension drops. The impact of a suspension drop provides a unique model system to probe the complicated interplay between hydrodynamic instability and the non-trivial rheology of complex fluids. Here, we present a comprehensive study of colloidal suspension drop impact to explore the rich flow behaviors in conditions that are inaccessible via conventional rheometry. We study the dynamics of suspension drops by impacting a millimetric size droplet on a solid glass surface while varying the volume fraction and impact conditions. We find that the extent of spreading decreases with increasing volume fraction or decreasing impact velocity. Moreover, we present a state diagram that delineates the inertial spreading regime from thickening regime and the jammed solid regime. Furthermore, we observe a variety of elastic behaviors which appears in the jammed regime and are controlled by adjusting volume fraction and impact velocity.

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