

Abstract Submitted  
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**Caustics and collisions of inertial particles** RAMA GOVINDARAJAN, S. RAVICHANDRAN, Tata Institute of Fundamental Research, Centre for Interdisciplinary Sciences, SAMRIDDHI RAY, International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, P. DEEPU, Tata Institute of Fundamental Research, Centre for Interdisciplinary Sciences — Caustics are formed when inertial particles of very different velocities collide in a flow, and are a consequence of the dissipative nature of particle motion in a suspension. Using a simple model for vortex-dominated flow with heavy particles, we suggested that sling caustics form only within a neighbourhood around a vortex, the square of whose radius is proportional to the product of circulation and particle inertia. Particles starting close to this critical radius congregate close together, resulting in large spikes in (Lagrangian) number density. We test these predictions by counting the number of collisions of particles in a randomly forced flow and correlating the collision locations with vorticity. We also study the effect of caustics on droplet growth in a super-saturated environment. We hope that these studies will be of interest in long-standing problems of physical interest such as the mechanism of broadening of droplet spectra in a turbulent flow.

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