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Dynamics of Bouncing-vs.-Merging Responses in Jet Collision MINGLEI LI, Tsinghua University, ABHISHEK SAHA, DELIN L. ZHU, Princeton University, CHAO SUN, Tsinghua University, CHUNG K. LAW, Princeton University — Collision of two fluid masses is a common natural and industrial phenomenon. Many kinds of noncoalescence phenomena of collisional fluid masses, such as droplet & droplet, droplet & liquid film, have been studied, and the dynamics of the gas layer between the colliding liquid surfaces was found to play a crucial role. However, many fluid mass collision processes are nonstationary, making it difficult to study this air layer dynamics in detail. Jet bouncing can be in a stationary state with a geometrically simple gas layer, providing an ideal system to investigate the dynamics of the air film between the colliding interfaces. In this work, we observe an entire suite of possible jet collision outcomes of (soft) merging, bouncing and (hard) merging with increasing impact inertia. These transitions between these different regimes are characterized through scaling analysis by considering the competing effects of impact inertia, surface tension and viscous thinning of the interfacial air-gap leading to activate the van der Waals force to effect merging.

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