

Abstract Submitted
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Particle-drop Impact in Midair¹ ALIDAD AMIRFAZLI, Department of Mechanical Engineering, University of Alberta, STEFAN STRZEBIN, OLIVER PEISE, DAVID CHEVROLLIER — For the first time the impact of a drop and particle in the mid-air is studied, which is a fundamental physical phenomenon relevant to many applications involving a fluidized bed and a liquid jet, e.g. drug particle coating, and upgrading of heavy oil. To date it has not been clear what happens when a particle and drop collide in midair. An apparatus was build to allow deterministic impact of a particle and drop to occur in midair. Using high speed imaging the impact of three different particles with water drops is studied at different relative velocities. Possible collision outcomes are elucidated in terms of particle-drop diameter ratio, Weber number, and particle wettability. Three distinct regimes of bonding, ripping and coating, and shattering are identified and discussed in this novel study. The differences between on-axis versus off-axis impact is also briefly discussed.

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