ETH zürich

Institute of Fluid Dynamics
Institute of Energy and Process Engineering

Colloquium Thermo- and Fluid Dynamics

The characteristic rupture height of the mediating air film beneath an impacting drop on atomically smooth mica

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Before a droplet can contact a surface during impact, it must first drain the air beneath it. Over a wide range of impact velocities, the droplet first compresses the air into a thin film. Below a critical impact velocity, the air film remains intact, and the droplet rebounds off of the air film without making contact. Beyond this critical impact velocity, the droplet always makes contact. The initiation of contact requires a topological transition, whereby the initially connected gas domain is ruptured, and a liquid capillary bridge forms, binding the droplet to the surface. Here we probe this transition in detail around the critical impact velocity using calibrated total internal reflection (TIR) microscopy to monitor the air film thickness and profile at high speed during the impact process.

Kolinski studied both engineering mechanics and mathematics at the University of Illinois at Urbana–Champaign and graduated with bachelor›s degrees in both subjects in 2008, before earning a master›s degree in applied mathematics (Sc.M.) and a PhD in applied physics from Harvard University, in 2010 and 2013, respectively. His PhD thesis on «The role of air in droplet impact on a smooth, solid surface» was supervised by Lakshminarayanan Mahadevan and Shmuel Rubinstein. Supported by a Fulbright-Israel postdoctoral fellowship, he moved in 2014 to Israel to work with Eran Sharon and Jay Fineberg at the Racah Institute of Physics at the Hebrew University of Jerusalem. There he studied the inter-facial instabilities in fluid and solid systems such as water bells and the fracture of hydrogels.

Since May 2017, Kolinski has been a Tenure Track Assistant Professor at EPFL and the head of the Laboratory of Engineering Mechanics of Soft Interfaces (EMSI) at EPFL›s School of Engineering.

Date: Wednesday, 24 May 2023
Time: 16:15 - 17:15h
Place: ETH Zurich, ML H 44
Host: Prof. Outi Supponen, IFD, D-MAVT

Further information: https://ifd.ethz.ch/events/ktf.html

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