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Ingredients Involved in 'Splashing' Revealed

"Splashing" plays a central role in the transport of pollutants and the spread of diseases, but while the sight of a droplet striking and splashing off of a solid surface is a common experience, the actual physical ingredients and mechanisms involved in splashing aren't all that well understood.

A team of Brown University and Harvard University researchers has discovered that there is indeed more involved in splashing than previously believed. They will discuss their findings at the upcoming American Physical Society's 64th Annual Division of Fluid Dynamics Meeting, which will be held Nov. 20-22, 2011, in Baltimore, Maryland.

"In recent studies, it was highlighted that the surrounding air plays an important role in the splashing process. Decreasing the ambient pressure inhibits splashing," explains Julie Albagnac, a postdoctoral research associate in engineering at Brown. "The observations led to a hypothesis of the existence of a thin layer of air trapped between the drop and the surface."

To better understand droplet splashing, the researchers initially wanted to observe and measure this layer of trapped air. They hypothesized that splashing may occur even before actual contact of the drop on the surface, while the drop is still spreading on an air film.

Unfortunately, they found that experimental equipment available today isn't sophisticated enough to catch a length as small as the air layer thickness (hundreds of nanometers) during the short time of existence of this air layer (hundreds of nanoseconds). So they instead studied the time evolution and behavior of droplets splashing with various impact velocities under a variety of ambient pressures to examine different scenarios involving splashing.

For this purpose, experiments performed at Harvard provide side and bottom views of the droplets. "This study shows a new signature of a precursor to the splashing through the wriggling of the contact line at the interface between the droplet and the surface," says Albagnac.

The splashing/spreading of a droplet doesn't seem to be an on/off situation, according to the team. A transition regime exists between the spreading and splashing, which they observed by changing either the impact velocity or the ambient pressure while the other is fixed.

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MORE MEETING INFORMATION

The 64th Annual DFD Meeting is hosted by the Johns Hopkins University, the University of Maryland, the University of Delaware and the George Washington University. Howard University and the U.S. Naval Academy are also participating in the organization of the meeting. It will be held at the Baltimore Convention Center, located in downtown Baltimore, Md. All meeting information, including directions to the Convention Center, is at: http://www.dfd2011.jhu.edu/index.html

USEFUL LINKS

Main Meeting Web Site: http://www.dfd2011.jhu.edu/index.html

Search Abstracts: http://meeting.aps.org/Meeting/DFD11/Content/2194

Directions and Maps: http://www.dfd2011.jhu.edu/venuemaps.html

PRESS REGISTRATION

Credentialed full-time journalists and professional freelance journalists working on assignment for major publications or media outlets are invited to attend the conference free of charge. If you are a reporter and would like to attend, please contact Charles Blue (cblue@aip.org, 301-209-3091).

SUPPORT DESK FOR REPORTERS

A media-support desk will be located in the exhibit area. Press announcements and other news will be available in the Virtual Press Room (see below).

VIRTUAL PRESS ROOM

The APS Division of Fluid Dynamics Virtual Press Room features news releases, graphics, videos, and other information to aid in covering the meeting on site and remotely. See: http://www.aps.org/units/dfd/pressroom/index.cfm