Beitrag ID: **6** Typ: **Talk**

Contact spreading under drops impacting a substrate covered by a thin oil layer

A drop impacting on a substrate deforms before the wetting occurs and a thin film of air is formed between the liquid and surface. When a drop gets sufficiently close to the surface within a few micrometers, it will most likely contact the underlying surface in a time on the order of 0.02 s. For experiments done under the same conditions, the time that the wetting occurs varies. Here, we consider rigid substrates covered by thin oil layers of different viscosities and thicknesses. We are less interested in the moment of wetting itself, but rather in the dependence of the velocity of the propagating wetting front once contact has been established. It propagates at velocities of few meters per second. The process can also be seen from the perspective of the thin air layer: It ruptures, and the drop and the substrate coalesce. Important parameters are expected to be the entrained air layer thickness, the oil layer thickness and its viscosity, as well as the actual spreading / receding motion of the drop. The actual air layer profile depends on the impact velocity, ambient gas, drop liquid as well as the deformability of the substrate.
We study the wetting front velocity for water and oil droplets impacting on lubricated substrates using high-speed single color interferometry at oblique incidence. Figure 1 shows a time series of the impact of a droplet with velocity $v = 0.44$ m/s in side view images and bottom view interference. We show how the wetting velocity depends on the oil parameters and the air thickness.

Hauptautor: Dr. MORADIMEHR, Shiva (Dept. of Engineering, Brandenburg University of Applied Sciences, Germany)

Co-Autor: Prof. HARTH, Kirsten (Dept. of Engineering, Brandenburg University of Applied Sciences, Germany)

Vortragende(r): Dr. MORADIMEHR, Shiva (Dept. of Engineering, Brandenburg University of Applied Sciences, Germany)