

## Internship

# Curtain coating: influence of particles

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Curtain coating is a standard industrial technique used to deposit a thin layer of liquid on substrates of large size. A curtain of liquid consists of a vertical liquid sheet of small thickness. The curtain is created by an overflowing tank and falls upon the substrate. The thickness of the final coating is controlled by tuning the height between the tank and the substrate or the flow rate. However, in some situations, the liquid film can become unstable, which leads to irregular coatings and a rejected final product. The situation is especially complicated in presence of particles, often added to the liquid to obtain different properties. Indeed, when the thickness of the liquid layer becomes comparable to the particle size, the particles deform the liquid interface and lead to complex interactions, thus modifying the stability of the liquid film as illustrated in Fig. 1.

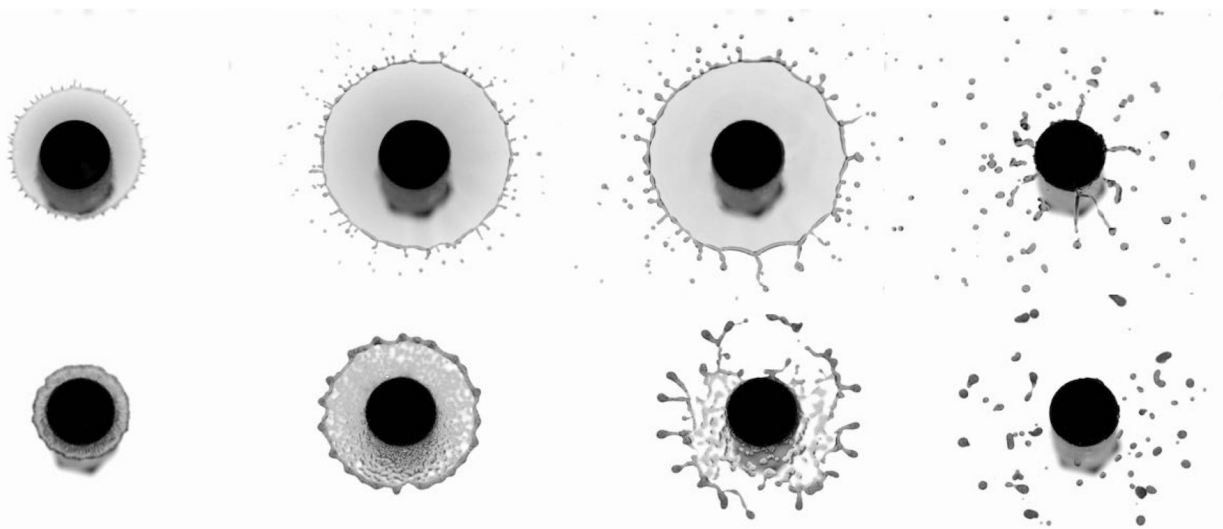


Figure 1: Time-lapse showing the expansion and the atomization of a liquid sheet produced by a droplet impacting on a small target for a pure liquid (top) and a suspension (bottom).

This internship aims at experimentally investigating the dynamics of a particle-laden liquid film. An experimental setup will be designed to produce a controlled liquid curtain. Different experimental methods, already used in the laboratory, will be implemented to obtain the thickness of the liquid curtain and the fluid velocity. The influence of the particle on the local dynamics and the stability of the liquid curtain will be investigated. The experimental results will be rationalized theoretically by taking into account the influence of the liquid film on the particles transport through the capillary and drag forces.

**This internship, funded by Saint-Gobain Recherche, will take place in SVI laboratory (Aubervilliers).** This internship could be followed by a PhD thesis in SVI laboratory on related topics (CIFRE funding).