



## Master thesis project

# Experimental investigation of liquid film height on a rotating disk

The mechanical and chemical wet-processing (cleaning, rinsing, etching) of technical surfaces is often realized by applying a thin film of the operating liquid on the surface to be processed. Lam Research AG at Villach is a leading manufacturer of spin clean and spin etch tools, which use this technique to process the surface of rotating silicon wafers. The underlying transport of mass, momentum, heat, and chemical reactants is strongly influenced by the local film height. The present work shall experimentally investigate the radial variation of the height of the liquid film, whose motion is predominantly driven by centrifugal forces. The operating liquid is supplied by a vertical jet, as sketched in Fig. 1(a) and seen in the photographic image of the real process chamber in Fig. 1(b). The experimental data acquired for a wide range of operating conditions shall be further compared against analytical/theoretical predictions for the film height as well as data from the literature. A particular focus will be on the effect of the waviness of the film. The analytically based computational descriptions commonly assume smooth, i.e. non-wavy, film surfaces. Especially in the case of high volumetric flow rates of the supplied liquid, however, this assumption does not hold in the outer radial region of the disk.

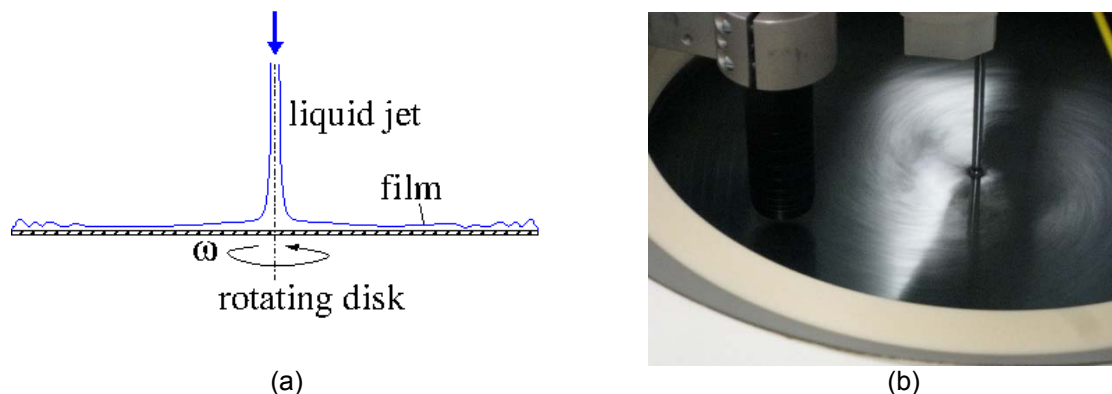


Fig. 1: a) Spreading of a liquid film on the rotating disk, b) Photo of real process

### Tasks

- Measurement of the film thickness for selected operating conditions
- Processing and analysis of the experimental data.
- Computation of the radial variation of the film height based on theoretical/analytical descriptions.
- Comparison of the experimental data against computational results and data from literature.
- Documentation.

### **Terms and conditions**

The present work is carried out in cooperation with the industrial partner Lam Research AG. The starting time is at earliest convenience. A financial compensation is offered.

### **Contact**

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