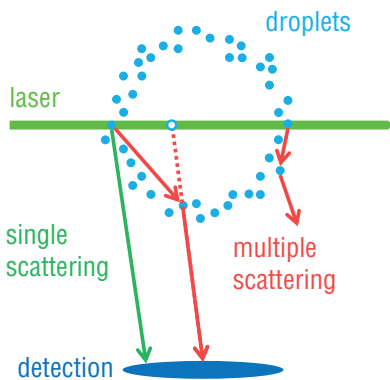


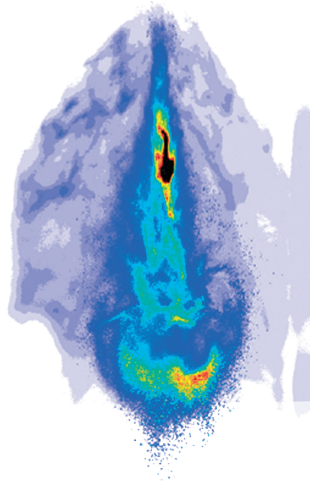
# Structured Laser Illumination Planar Imaging (SLIPI)

Effective stray light rejection in dense sprays

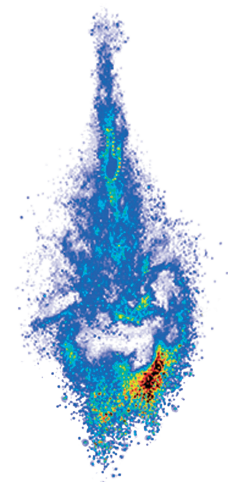


**Structured Laser Illumination Planar Imaging (SLIPI)** is an established technique in planar laser imaging to remove imaging artifacts arising from higher order scattering in 2-phase fluids, such as sprays. Multiple light scattering generates misleading results, especially when applied to 2-color radiometric methods like LIF/Mie. Using **SLIPI** instead, the quality of results from planar spray imaging is drastically improved.

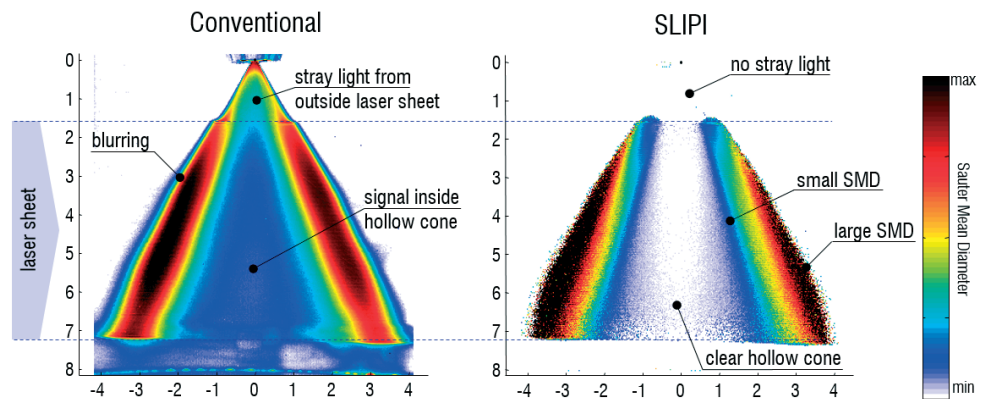
**Conventional light sheet imaging**



**Instantaneous SLIPI spray imaging**



**SLIPI rejects unwanted stray light**, i.e. scattered light of higher order, in dense media. When a spray is illuminated with a light sheet, not only the direct light from this plane arrives at the camera, but also a large amount is multiply scattered causing unwanted stray light in the image.



*Stray light in spray imaging affects conventional LIF/Mie droplet sizing. SLIPI rejects image artefacts and delivers higher quality SMD maps.*

## Benefits

- ▶ effective suppression of multiple scattering, indirect reflections and stray light
- ▶ image contrast enhancement improving visualization of break-up and atomization processes in dense sprays
- ▶ improved result quality for planar droplet sizing ( $D_{32}$  by LIF/Mie)
- ▶ feasible for instantaneous and averaged imaging

*courtesy of Y.N. Mishra, E. Kristensson, E. Berrocal, Lund University*

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SLIPI approaches for  
high temporal and spatial  
resolution

### SLIPI Systems

The **SLIPI** Optics Module works as an Add-on to an existing laser imaging system. It will be applied to the laser beam, at the position of the sheet optics. The output is a spatially modulated laser sheet.

Three different approaches for **SLIPI** are available, depending on the application:

1p-**SLIPI** works with a single laser shot and a fixed pattern modulated light sheet for highest temporal resolution and a minimum of technical effort.

2p-**SLIPI** makes use of dual-cavity lasers to achieve an optimum spatial resolution instantaneously.

3p-**SLIPI** is based on phase scans and the best choice for time averaged applications like planar droplet sizing (LIF/Mie).

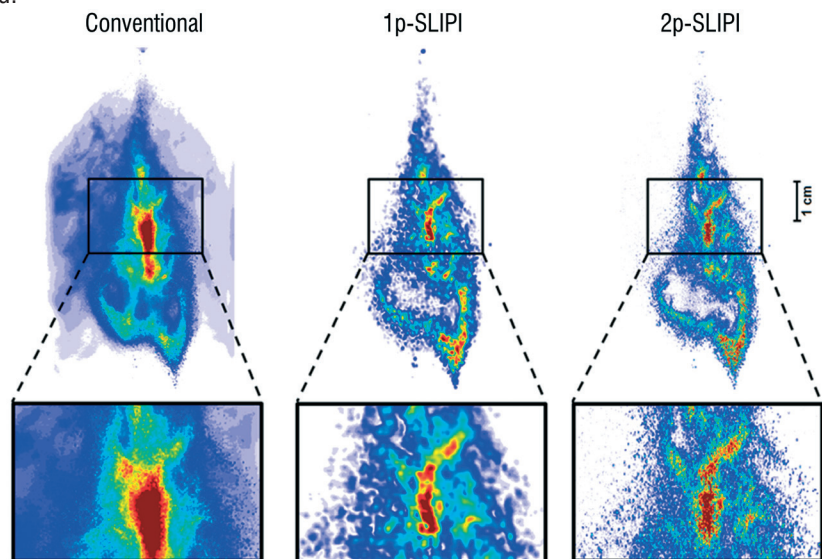


Image quality enhancement  
of 1p/2p-SLIPI

### Instantaneous 1p and 2p-SLIPI

Both, 1p and 2p-**SLIPI** allow to capture a single spray shot instantaneously. This novel approach reveals fully time resolved spray images.

1p-**SLIPI** achieves a spatial resolution limited to the pattern size of the light sheet modulation. Using a dual-cavity laser for 2p-**SLIPI**, the entire spray is illuminated, therefore smallest structures are conserved.



*Comparison of a conventional light sheet, a 1p and a 2p-SLIPI image from the same spray.*

Data provided by LaVision are believed to be true. However, no responsibility is assumed for possible inaccuracies or omissions. All data are subject to change without notice.

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