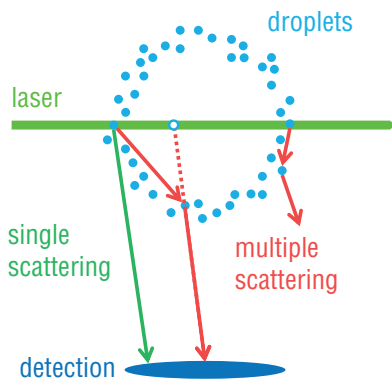


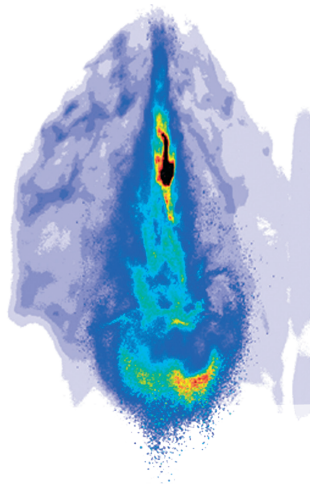
Structured Laser Illumination Planar Imaging (SLIPI)

Effective stray light rejection in dense sprays

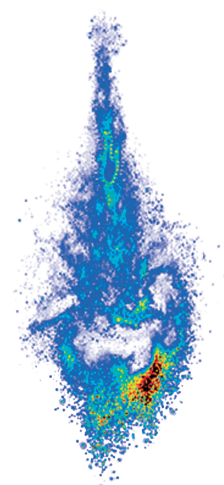


Structured Laser Illumination Planar Imaging (SLIPI) is an established technique in planar laser imaging to remove imaging artifacts arising from higher order scattering in 2-phase fluids, such as sprays. Multiple light scattering generates misleading results, especially when applied to 2-color ratiometric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

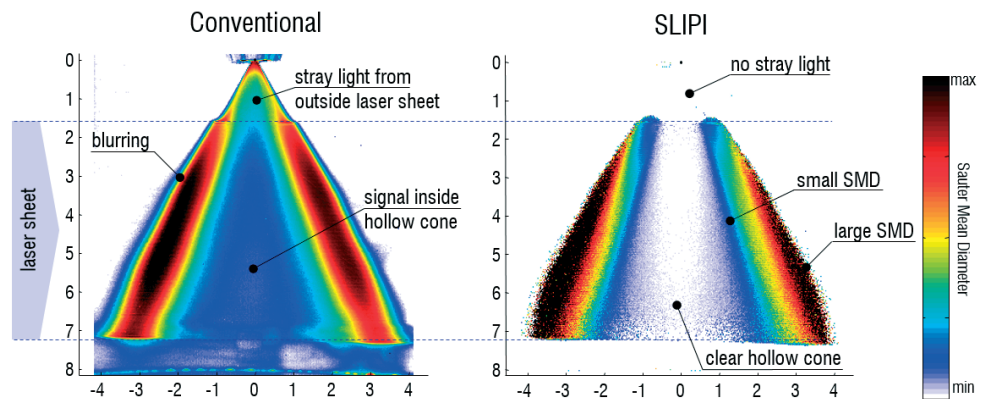
Conventional light sheet imaging



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

Image quality enhancement
of 1p/2p-SLIPI

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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.

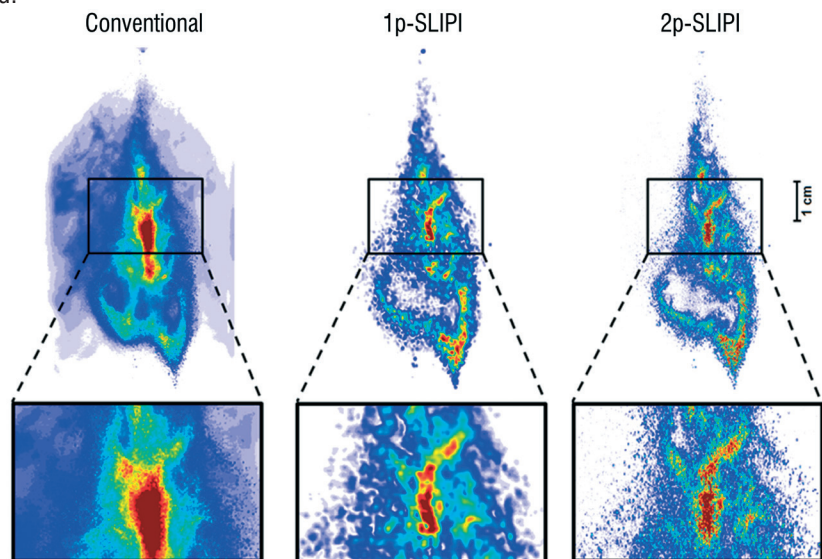
3p-**SLIPI** is based on phase scans and the best choice for time averaged applications like planar droplet sizing (LIF/Mie).



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.

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