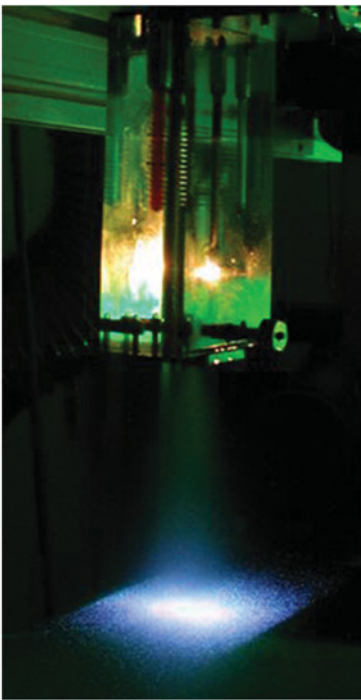
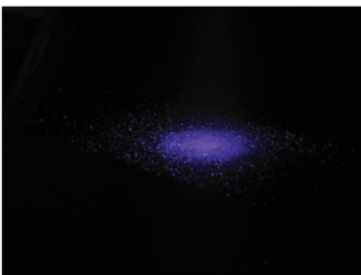


## SPECIFICATION

- high energy pulse Nd:YAG laser, beam energy 80 mJ at 266 nm, 100 mJ at 365 nm and 250 mJ at 532 nm
- light sheet thickness between 0.5 and 2 mm and of 100 mm width
- stereoscopic arrangement of CCD cameras with Scheimpflug lens, image resolution 1280x1024 pixels
- image capture frequency up to 10 Hz

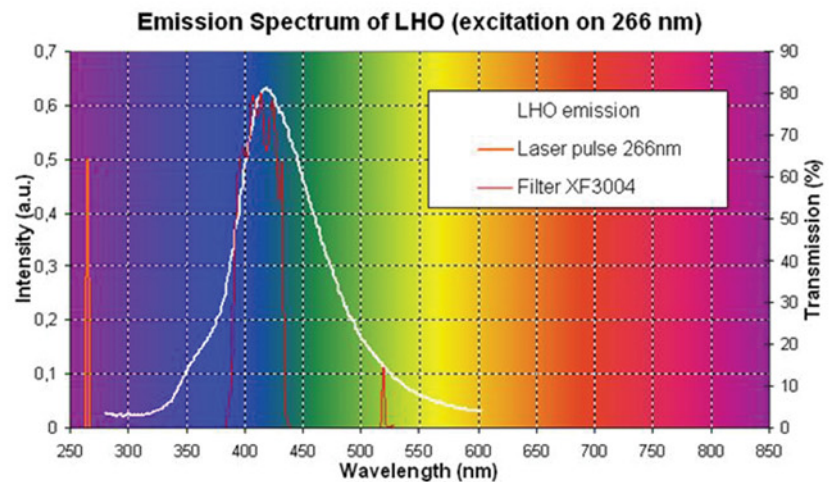


▪ PLIF of spray



# Planar Laser-induced Fluorescence (PLIF) by TSI Inc.

Planar laser-induced fluorescence is an advanced optical measuring method for investigation of scalar fields in liquids and gases (concentration, temperature, pH, composition). It is also employed in spray research where it is known as optical patterning – a method for determination of concentration of the liquid. Fluorescence-active molecules contained in the fluid are excited with a pulse UV laser as they absorb the light. When recovering their energy level prior to the excitation, they emit light at greater wave length. The intensity of the light emitted corresponds to the volume of the excited molecules thus concentration. Based on a fluorescence image record with a CCD camera, instantaneous distribution of temperature or concentration in a plane can be evaluated. The department makes use of a high performance, custom-made PLIF system by TSI Incorporated.



- Emission spectrum of heating oil

## TYPICAL APPLICATIONS

- spray analysis:
  - optical patterning (measurement of liquid concentration and mass flow rates)
  - measurement of Sauter mean diameter in sprays
- diagnostics of combustion, reactants and products analysis
- studies on substances mixing, high speed, reactive mixing etc.
- evaluation of temperature fields in liquids and sprays
- input data for validation of computational models (CFD)

## PROVIDED OUTCOMES

- instantaneous and averaged (mean and rms) images of concentration and temperature in a plane
- Sauter mean diameter of droplets in a plane
- by sequential measurement over a number of layers, a complete picture of a 3D domain can be obtained
- when combined with PIV method, mass flow rates in fluids can be evaluated (the arrangement available at the department)

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