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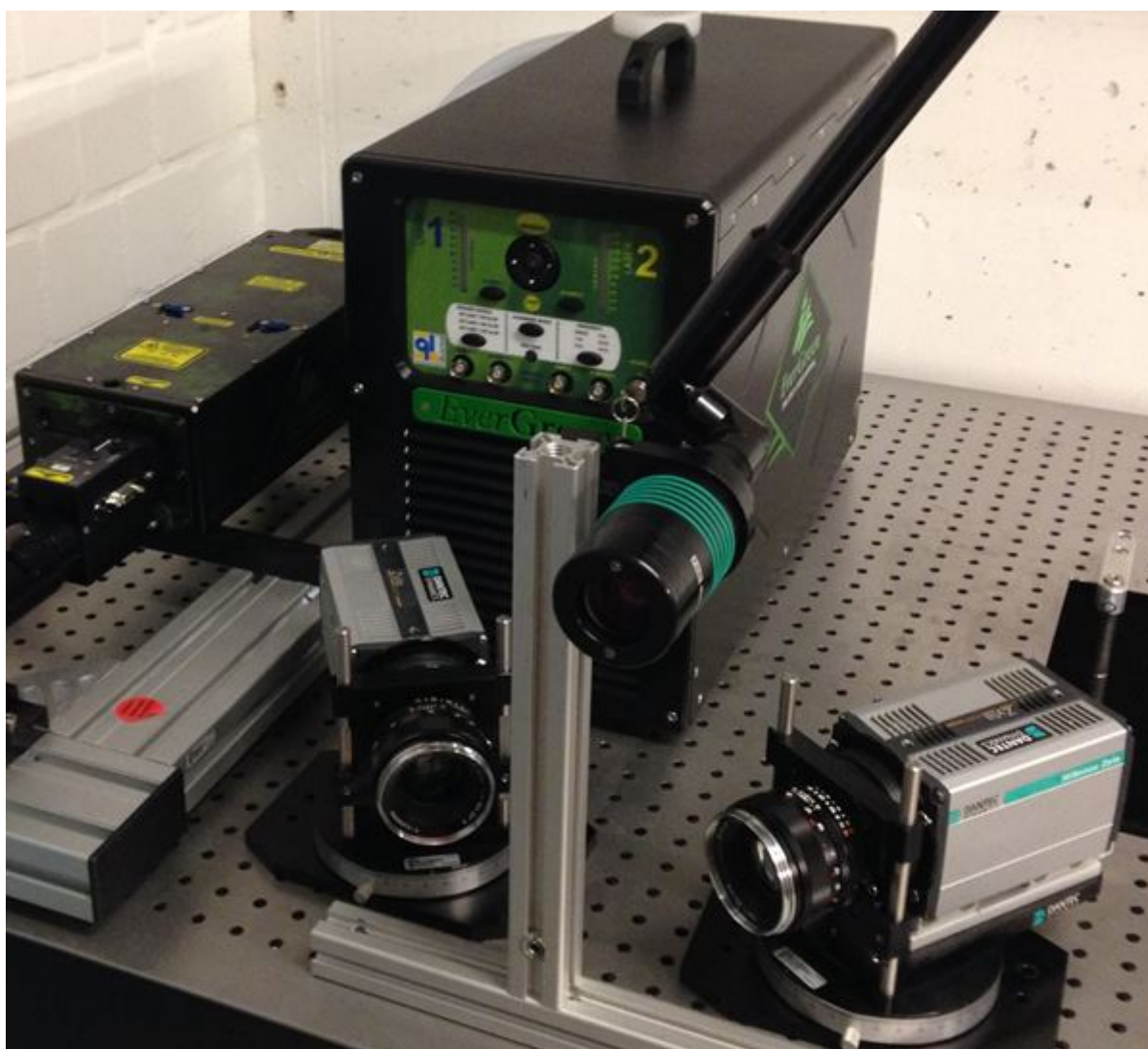
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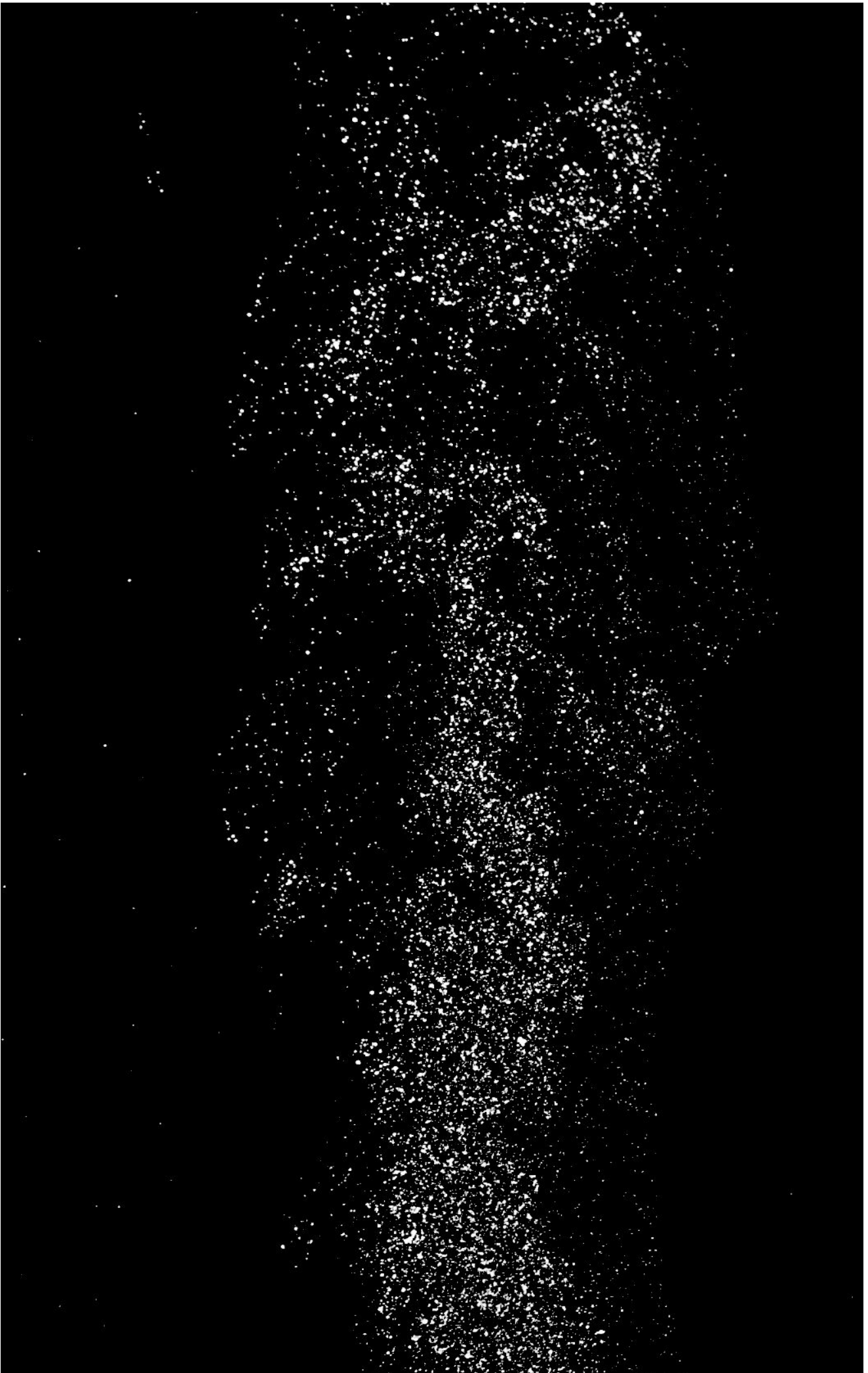


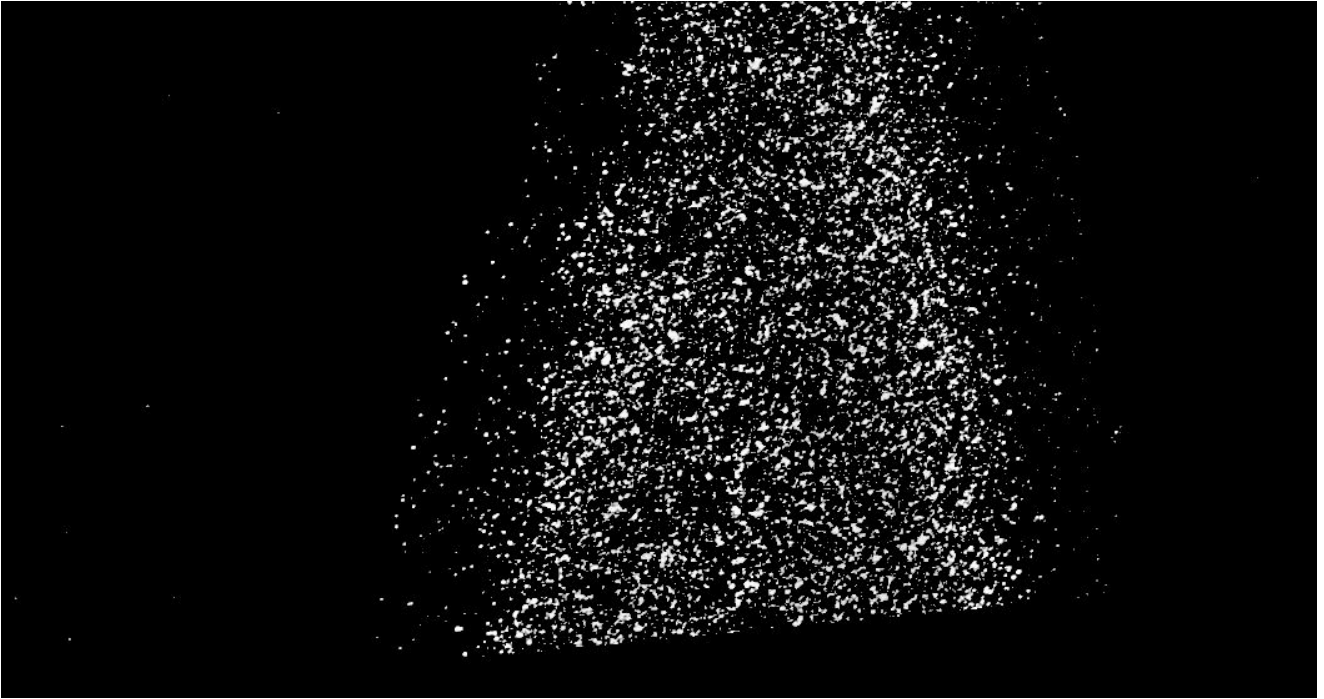
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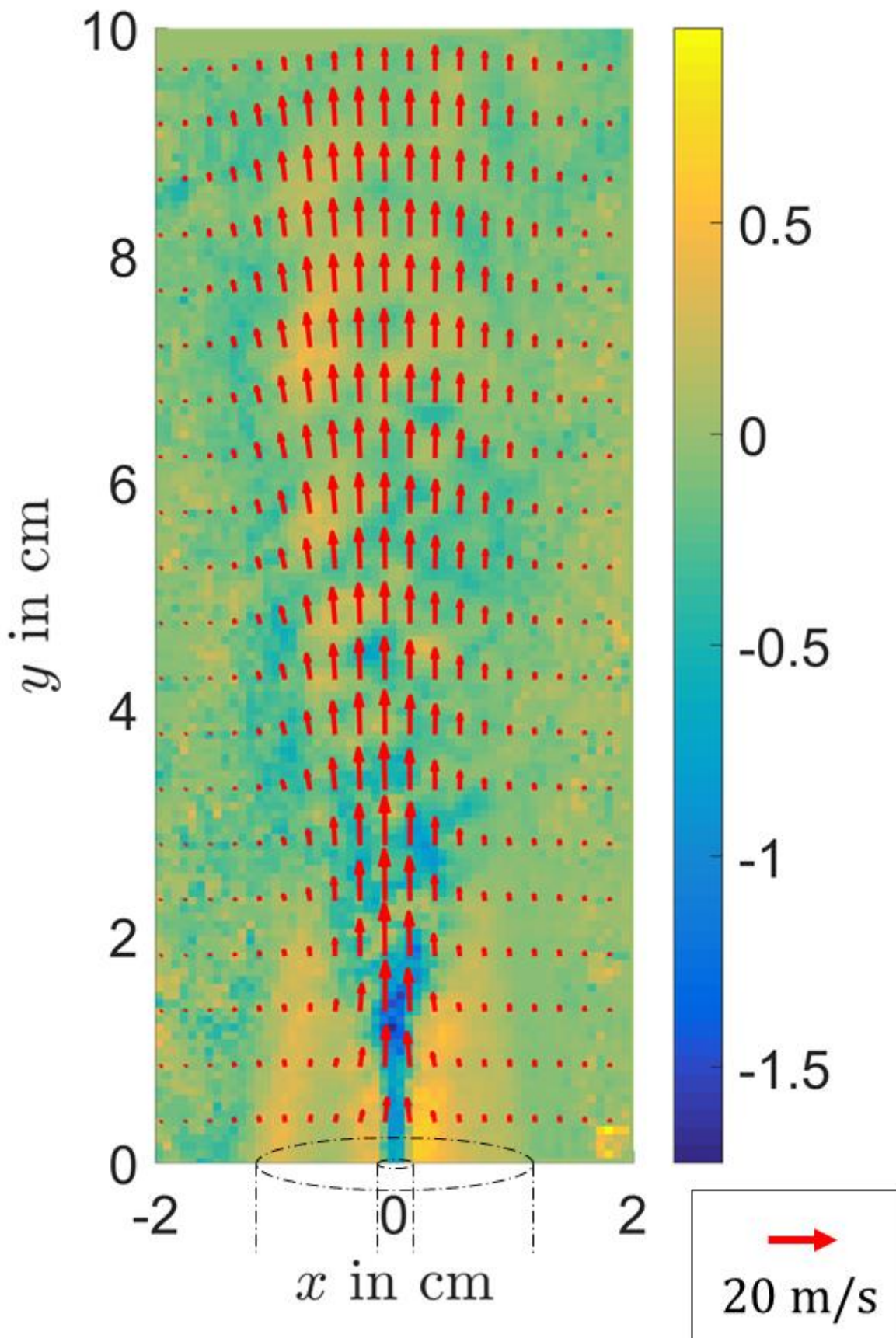
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Laboratory for flow measurement techniques









The measurement of flow velocity fields plays an important role in industrial and fundamental research, for example in energy technology and aerospace science. The optical method Particle Image Velocimetry (PIV) is used to determine flow fields by evaluating the movement of particles in the flow using pulsed illumination and one or more cameras. With a planar illumination, 2D flow field measurements of two (standard PIV) or all three (stereoscopic PIV) velocity components can be detected. The instantaneous measurement of 3D flow fields and all three velocity components is possible with the illumination of a

three-dimensional measurement volume (tomographic PIV). At BIMAQ the limits of measurability of these methods for different flows in manufacturing, process and energy technology are investigated, with a research focus on flow measurements in processes with inhomogeneous, fluctuating refractive index fields.

Research areas

- flow measurements in
 - hot jet flows
 - flame flows
 - two phase flows
- modeling and quantification of PIV measurement uncertainty caused by the influence of inhomogeneous refractive index fields
- correction of systematic measurement deviations
- limits of measurability of
 - standard PIV
 - stereoscopic PIV
 - tomographic PIV

Measurement service

- determination of flow fields with standard and stereoscopic PIV (2d3c)

Equipment

stereoscopic PIV system

- Nd:YAG dual pulsed laser (Quantel Evergreen):
 - pulse energy 2 x 200 mJ @ 532 nm
 - pulse rate 15 Hz
 - pulse width <10 ns
- sCMOS cameras (Andor Zyla):
 - pixel width 6.5 μm
 - 5.5 Mpixel
 - 16 bit
- light guide arm 2 m
- volumetric PIV and PTV evaluation

seeding generators for solid and liquid seeding

measurement objects

- jet flows with variable nozzle geometries
- flame flows of various burner geometries for
 - premixed and non-premixed flames
 - laminar and turbulent flames
 - swirled flames

Literature

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