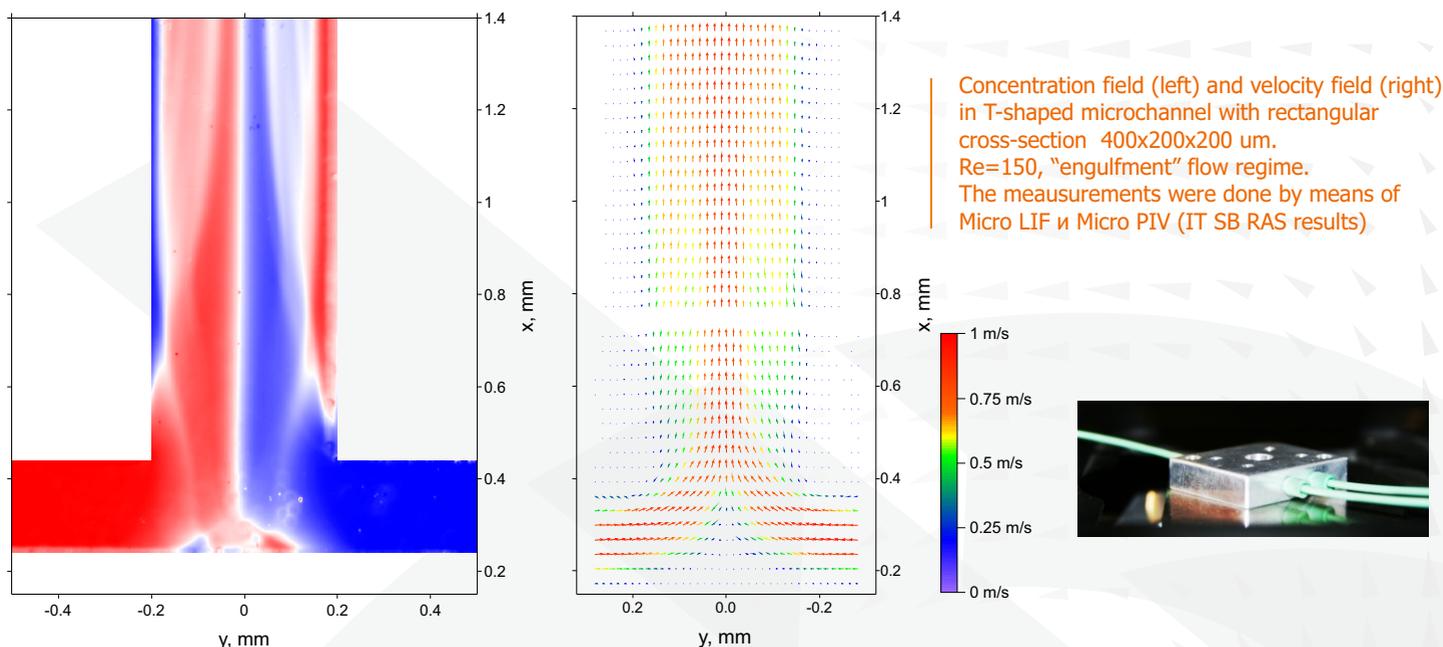


POLIS: microflow measurement system

Micro Particle Image Velocimetry (Micro PIV) is used for velocity field measurements at the flow plane in channels with diameters less than one millimeter. Laser beam going through microscope lens illuminates fluorescent microparticles in the flow. Light emitted by fluorescent microparticles is recorded on dual exposure CCD camera connected to the microscope. To measure concentration field fluorescent dye is used (Micro LIF). To split up incident, indirect and emitted light filter set is used. Measurement plane thickness is defined by depth of field of the lens used.



MicroPIV technique features:

- Non-intrusive measurement technique;
- Allows to measure instantaneous and average velocity fields with micron resolution;
- Instantaneous concentration field measurements (Micro-LIF technique)
- Spatial resolution 1-10 $\mu\text{m}/\text{vector}$;
- Volume illumination through microscope objective;
- Fluorescent microparticles are used as tracers (with diameters from 0.5 to 2 μm);
- At small flow velocities Brownian motion of microparticles is taken into account;
- Measurement plane thickness is defined by depth of field of the lens used.

Applications:

- Development and research of microreactors, micromixers, micro heat-exchangers, micropumps, and other MEMS systems and technologies;
- Microhydrodynamics;
- Biomedical research: blood flow in vessels, microorganism shape and growth research, microorganism motion in liquids.

Measurement system components:

- Inverted epi-fluorescent microscope with a set of objectives with long working distances and high numerical aperture: Carl Zeiss, Olympus;
- Pulsed Nd:YAG or continuous DPSS laser;
- CCD camera;
- Fluorescent microparticles or dye;
- ActualFlow software with Micro PIV Kit;
- PC;
- Instruction manual.

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