

FLOW MEASUREMENTS IN A MICROCHANNEL

APPLICATION NOTE MicroPIV-001

Measurements in a diverging microchannel (shown in the figure) flow were made using a [TSI micro PIV system](#). TSI microPIV system uses patented concepts to obtain detailed and accurate measurements of microflows.

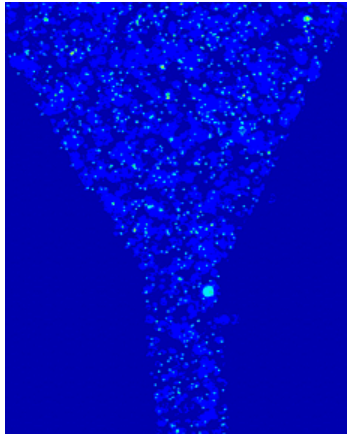
An inverted microscope arrangement was used to make measurements. The microscope components include a binocular with eyepiece; universal stage holder and traverse; nosepiece sextuple; illumination lamp kit; F-mount adaptor; epioptics attachment housing; and microscope objectives.

The measurement approach incorporates special methods for illumination, scattered light collection and analysis techniques. This approach, using epifluorescence, allows illumination and scattered light collection to use the same optical access to the flow channel. A lens system attached between the microscope and the camera increases the image field magnification and allows more uniform illumination of the flow field.

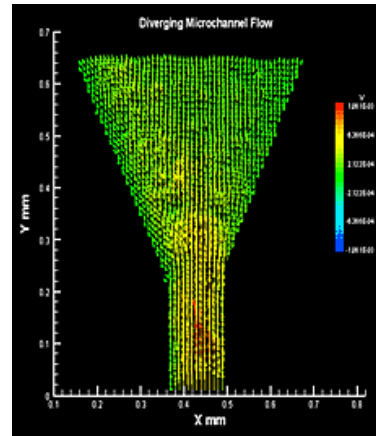
A laser light attenuator was attached to the laser to control the energy input for flow illumination. The attenuator allows good control over laser energy. The delivery system uses a light guide for convenient delivery of the laser light to the microscope. It consists of a light guide, a diffuser and lens to provide uniform beam intensity, along with adaptors for the microscope and the laser. The high SNR filter cube consists of a dichroic mirror, a barrier filter for 532 nm and a filter for the fluorescent light emission with wavelength above 560 nm.

The system was used to make measurements in a 150 microns wide (smaller portion) channel. The particle image field shows the presence of images that are out of focus. The special analysis scheme developed for microflow measurements removes the background effects and provides velocity field as shown below.





Particle image field in the Micro channel



Velocity field in the Micro channel



UNDERSTANDING, ACCELERATED

TSI Incorporated – Visit our website www.tsi.com for more information.

| | | | |
|----------------|-------------------------------|------------------|------------------------------|
| USA | Tel: +1 800 874 2811 | India | Tel: +91 80 67877200 |
| UK | Tel: +44 149 4 459200 | China | Tel: +86 10 8251 6588 |
| France | Tel: +33 4 91 11 87 64 | Singapore | Tel: +65 6595 6388 |
| Germany | Tel: +49 241 523030 | | |