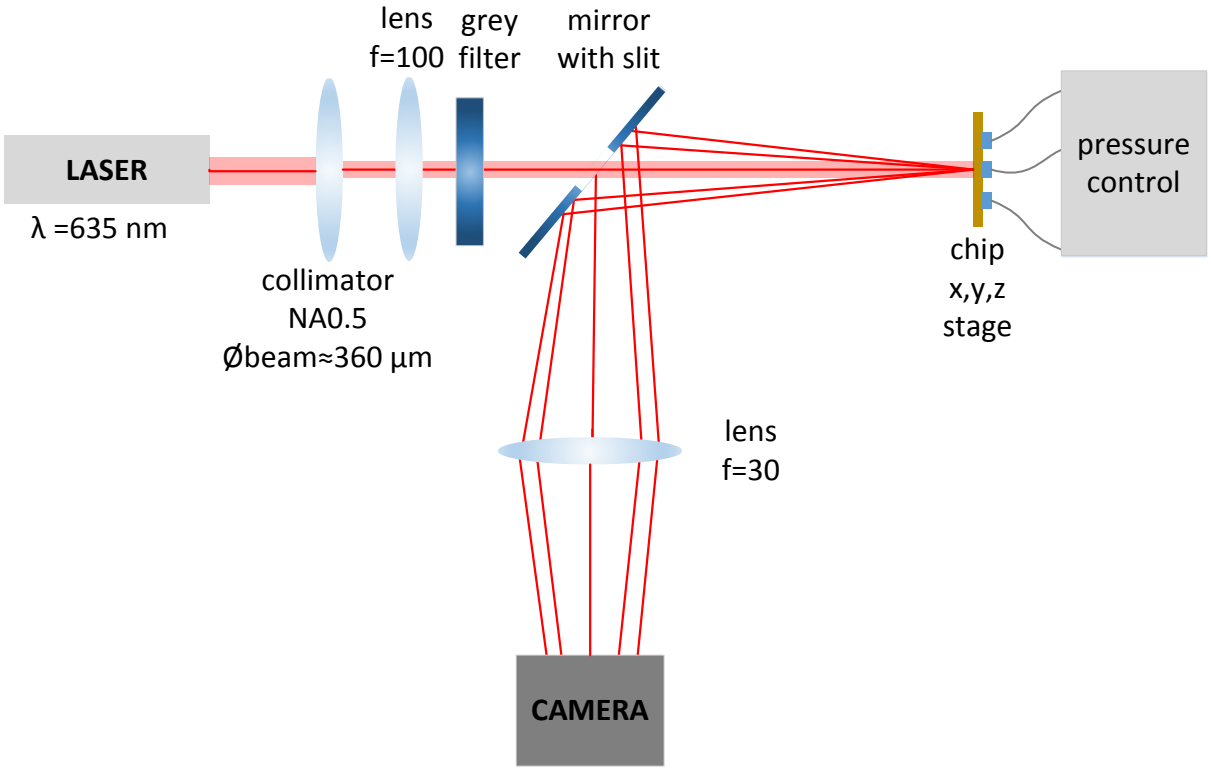
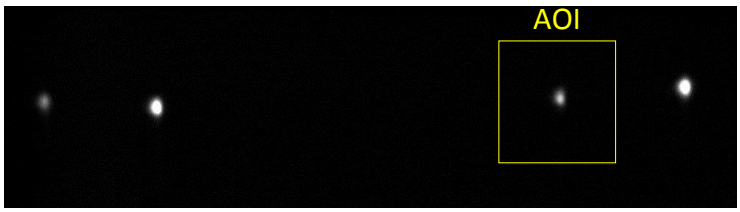
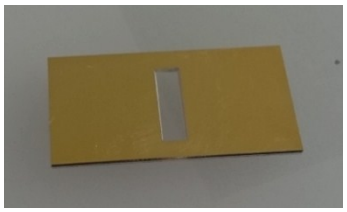
Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Information





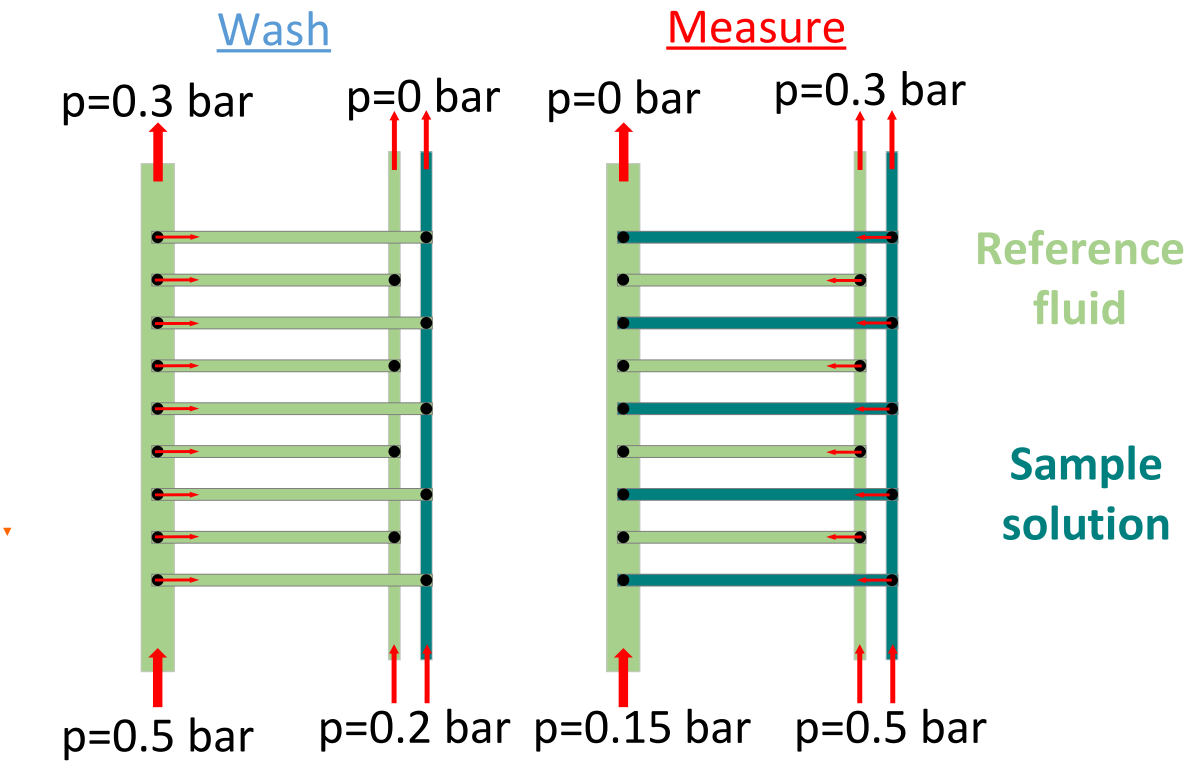
typical diffraction pattern recorded by the camera with area of interest around first maximum



mirror with slit

S 1: Setup of measurement. The observed diffraction pattern is generated when a collimated laser beam (l=635 nm, waste diameter 360 µm) impinges on the nanofluidic grating and is then reflected back onto a mirror and into a CCD camera (Thorlabs DCU223M or Andor iXon Ultra) that records the intensity. The mirror is made out of a glass wafer with a reflecting gold layer on top. A slit (3 mm x 10 mm) in the centre of the mirror allows the incoming laser beam to pass, but the diffraction pattern is reflected towards the camera. Only the 0^{th} maximum is not reflected as it also passes through the slit in the mirror. This is beneficial for the signal processing as the 0^{th} maximum is very bright compared to the other maxima and might interfere with the other maxima without containing any information.

The signal intensity of each maximum is measured by integrating the grey values over an area large enough to include the entire signal (AOI-area of interest).



S 2: Fluid flow in the nanofluidic grating by pressure control. Fluid is pumped continuously through the microchannels by the selected pressure values. During the wash step, the same fluid is pushed from the main microchannel (left) into the nanochannels. During the measure step, different reference / sample fluids are pushed from the respective microchannels into the nanochannels. The mentioned pressure values in S2 have been used for all measurements with water and glycerol solutions. In case of fluids with higher viscosities, like piranha solutions for cleaning, the pressure values were increased accordingly to ensure fluid flow.