Application example (use of 4-axis system)

Laser parameters

Wavelength:	800 nm
Pulse duration:	30 fs
Pulse energy:	800 µJ
Repetition rate:	1 kHz
Beam diameter:	4 mm (at 4-QD)

Goal

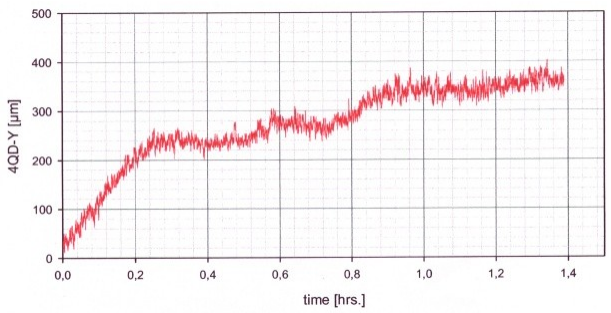
Adjustment of a laser beam into a hollow fibre for pulse compression

Desired precision for this application: relative deviations of 75 µrad maximum after the last deflection mirror

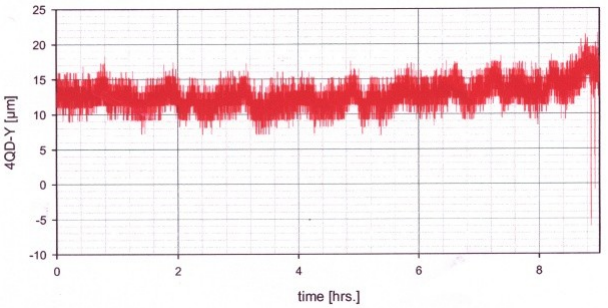
Results

We have recorded the beam positions in x and y direction by means of a 4-QD with fast read-out electronics. The following diagrams show the beam position in y direction for a period of serveral hours before and after the installation of the beam stabilization:

before



after



Before the stabilization the laser showed fast deviations with peaks of more than 100 µm as well as a slow thermal drift of more than 300 µm (the fast deviations can not be resolved in the plotted diagram above.) After the stabilization the fast deviations are reduced by a factor of 10 and the slow deviations are almost completely eliminated. The beam is stable within an angular range of 30 µrad. The desired precision is fulfilled.

Please note the different scaling in the diagrams. The outliers in the “after” diagram are due to a breakdown of laser power after 8 hours.