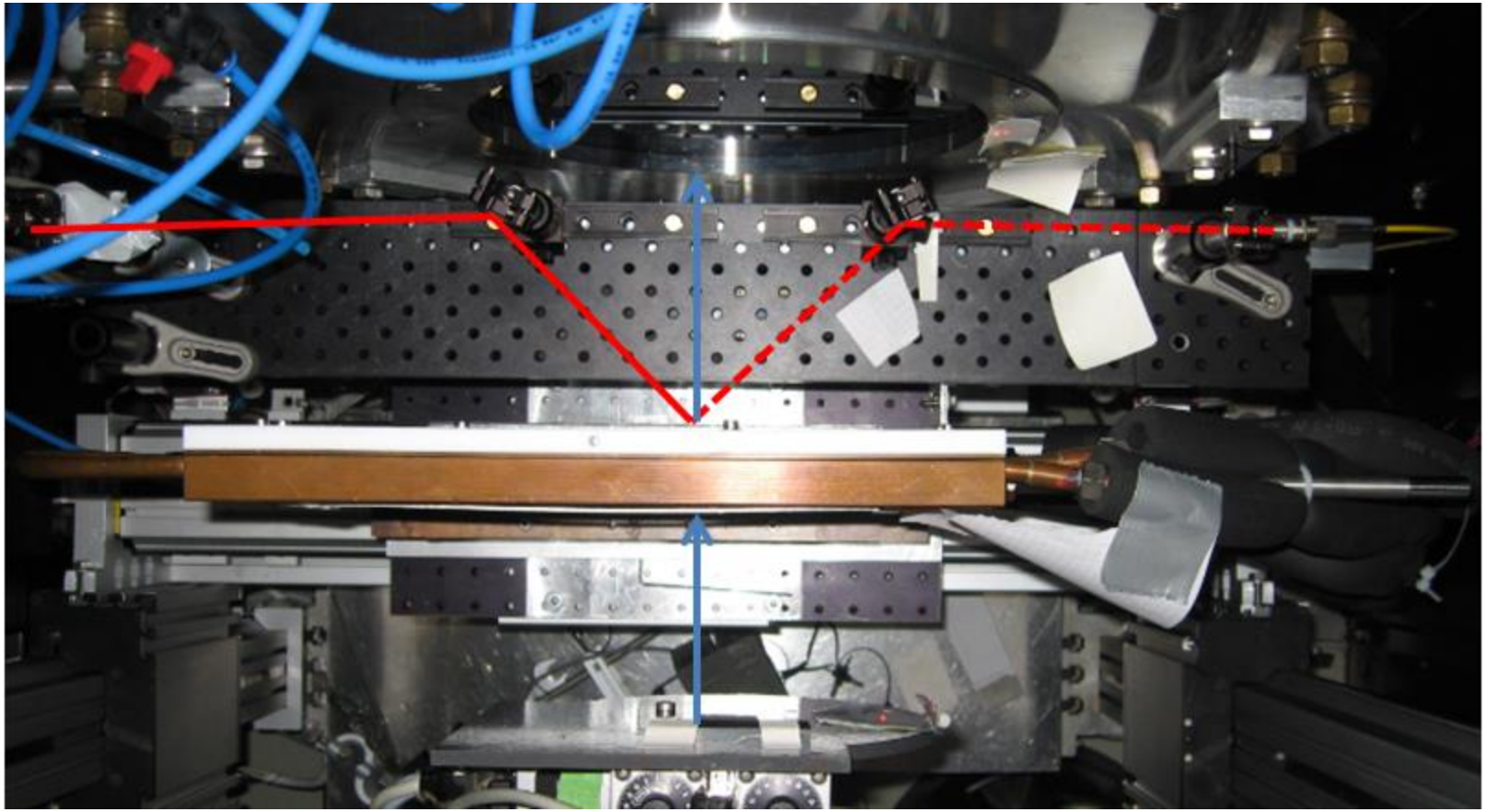
Combination of neutron and multi-angle dynamic light scattering within the NMI-3 project – a little historic overview

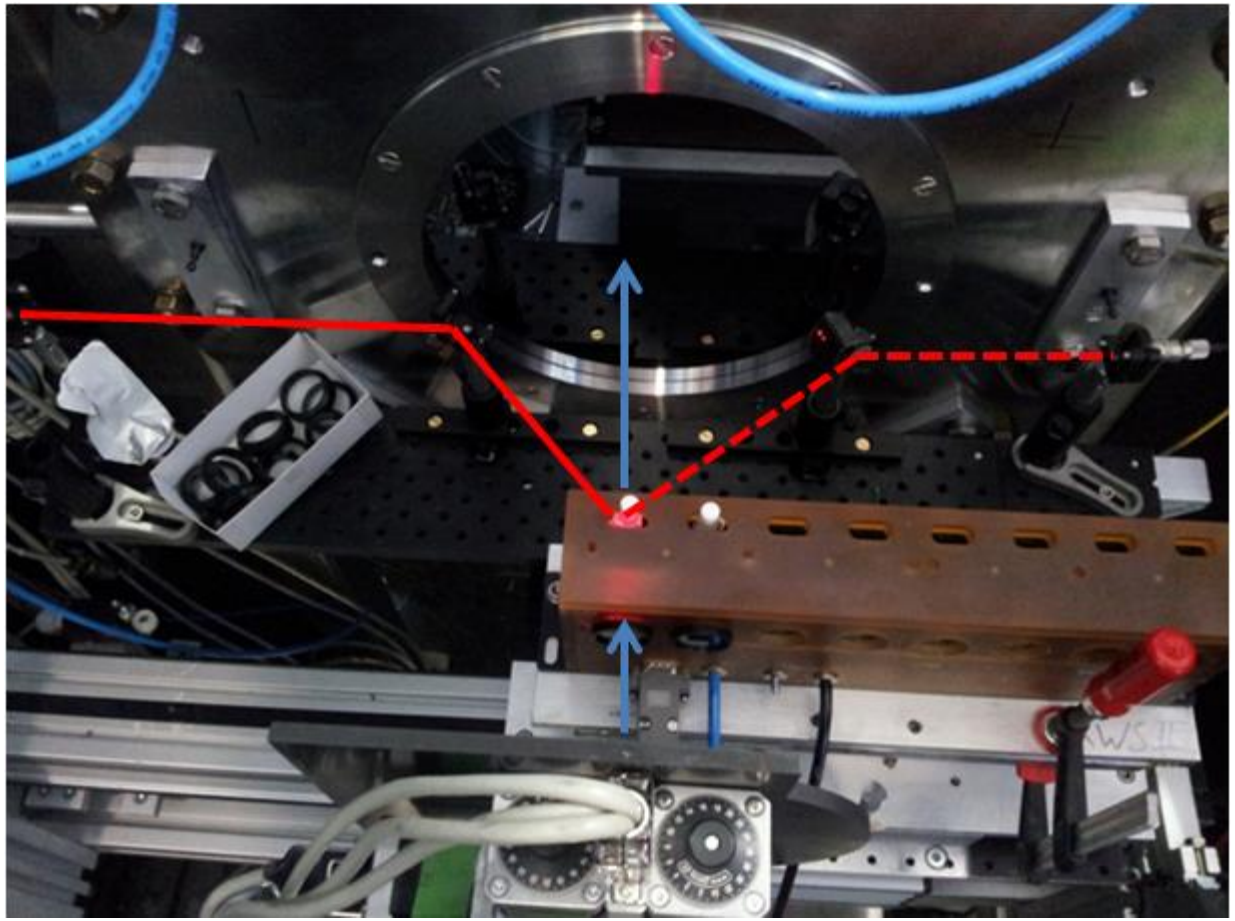
14.10.2015

Tobias E. Schrader

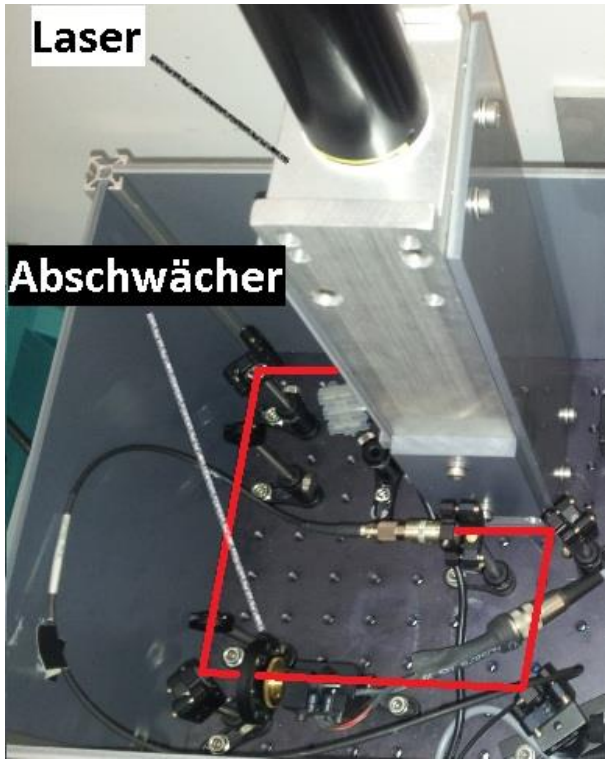
In routine operation at KWS-2

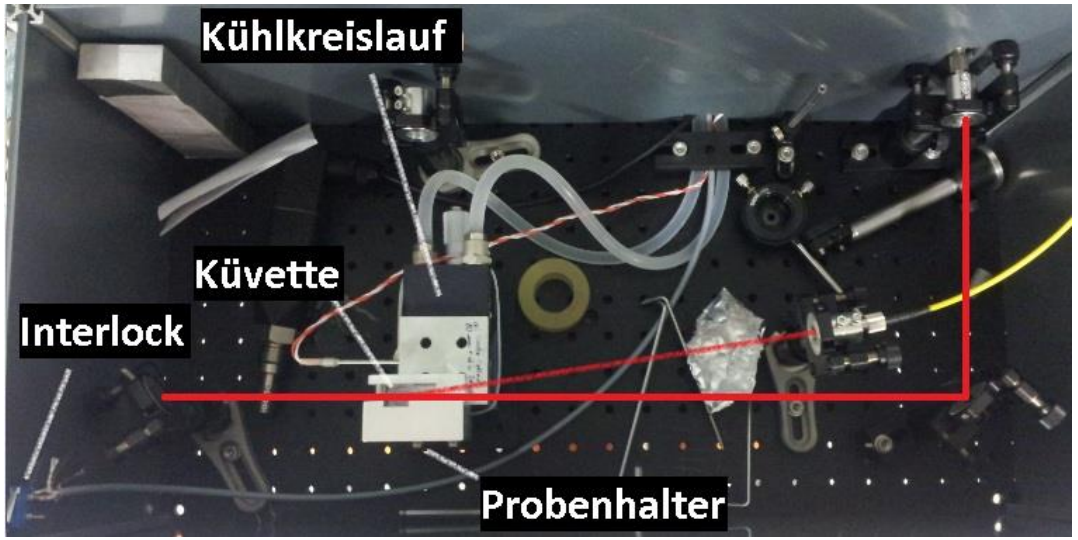


In routine operation at KWS-2

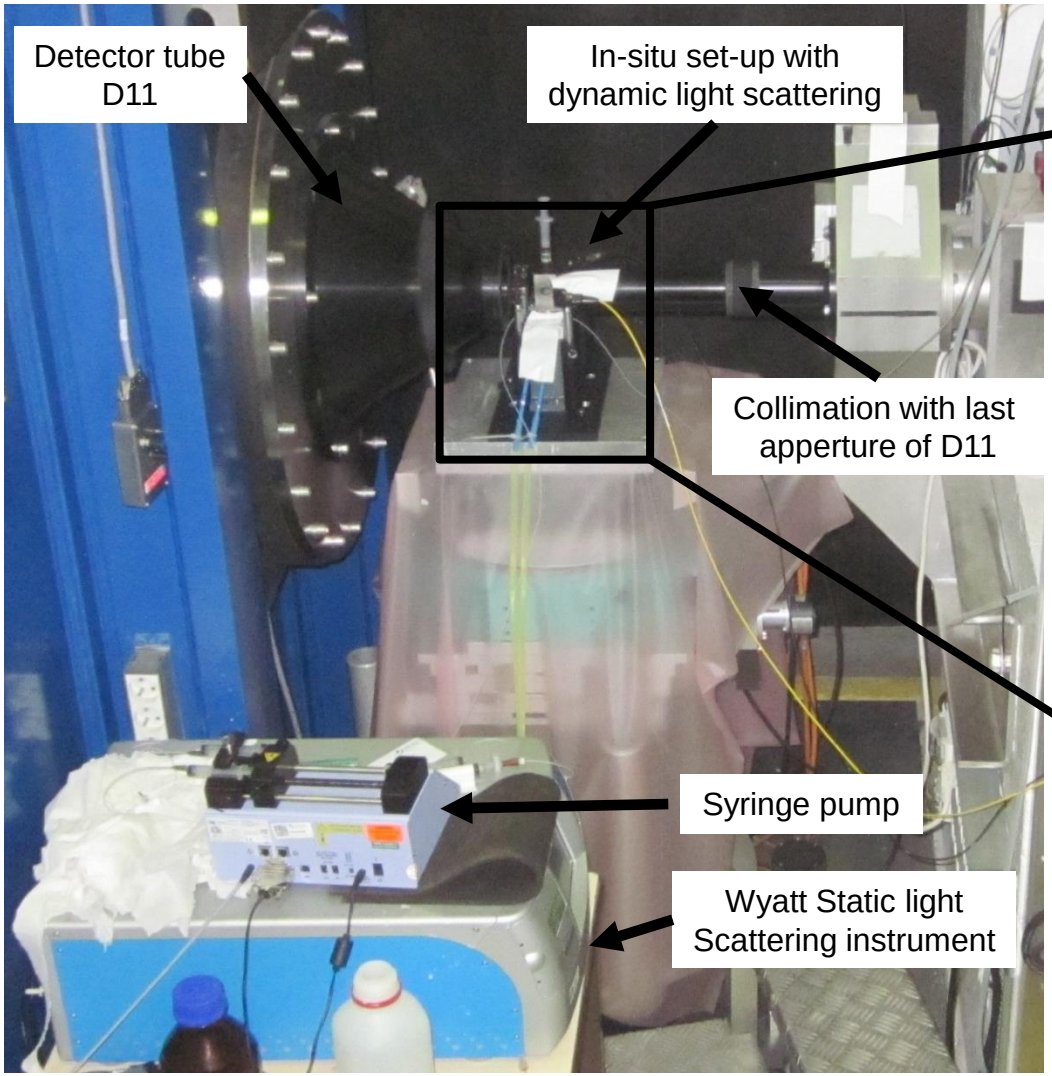


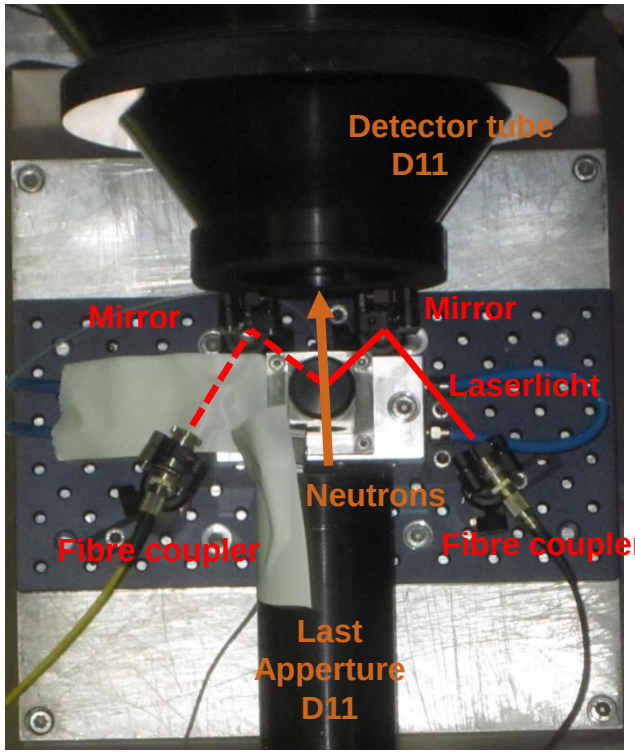
Dynamic light scattering, test set-up in the lab



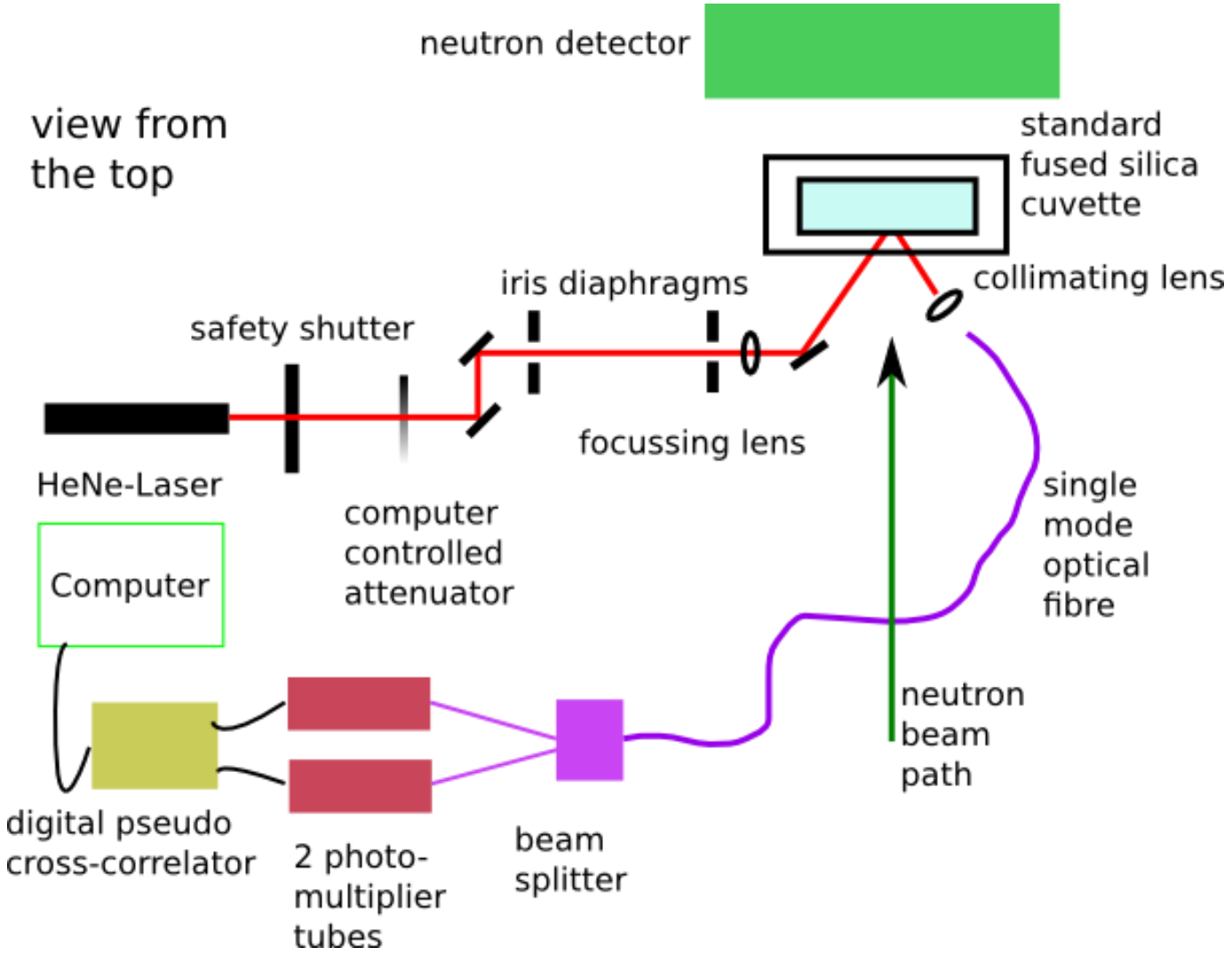


Picture of the set-up at D11





SANS combined with a goniometer type Dynamic light scattering



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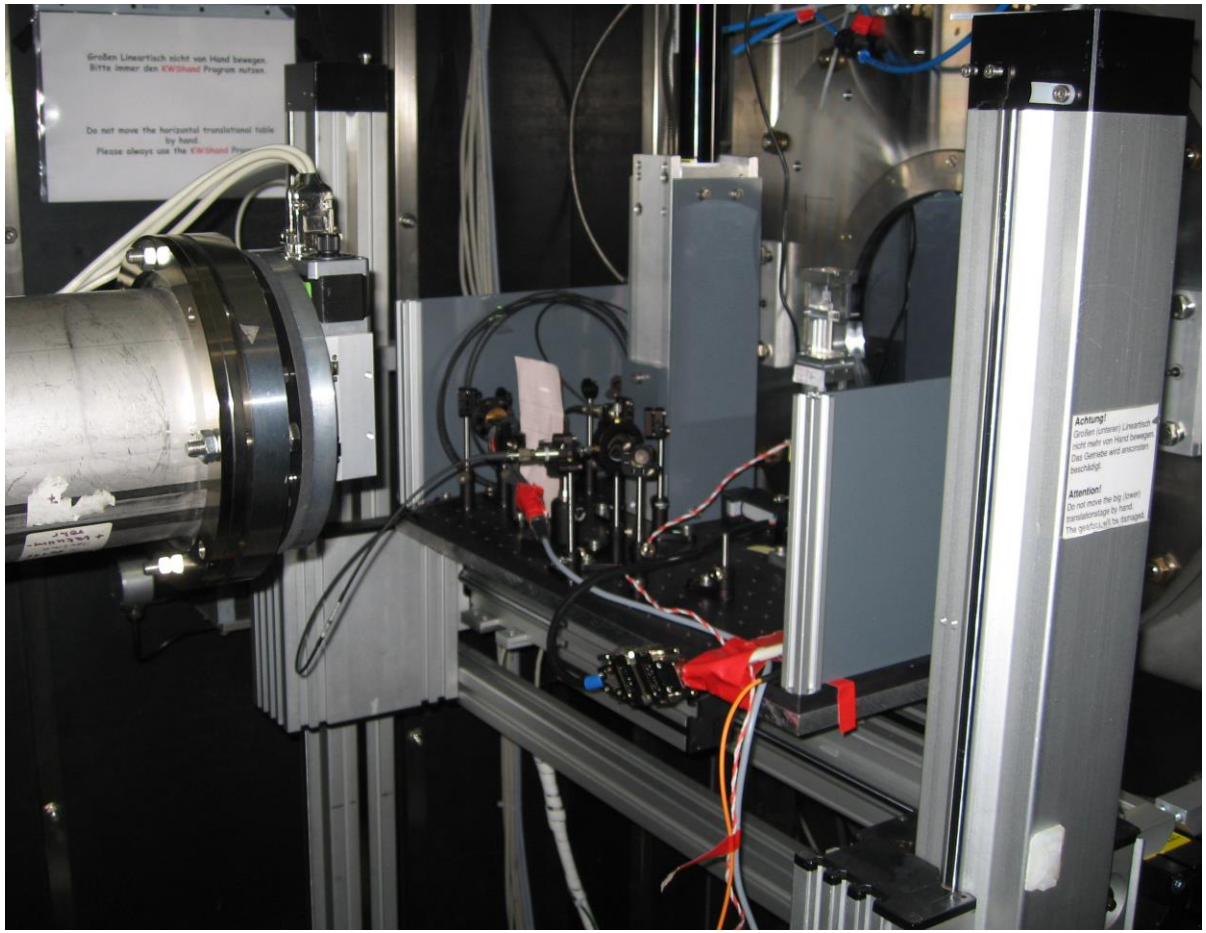
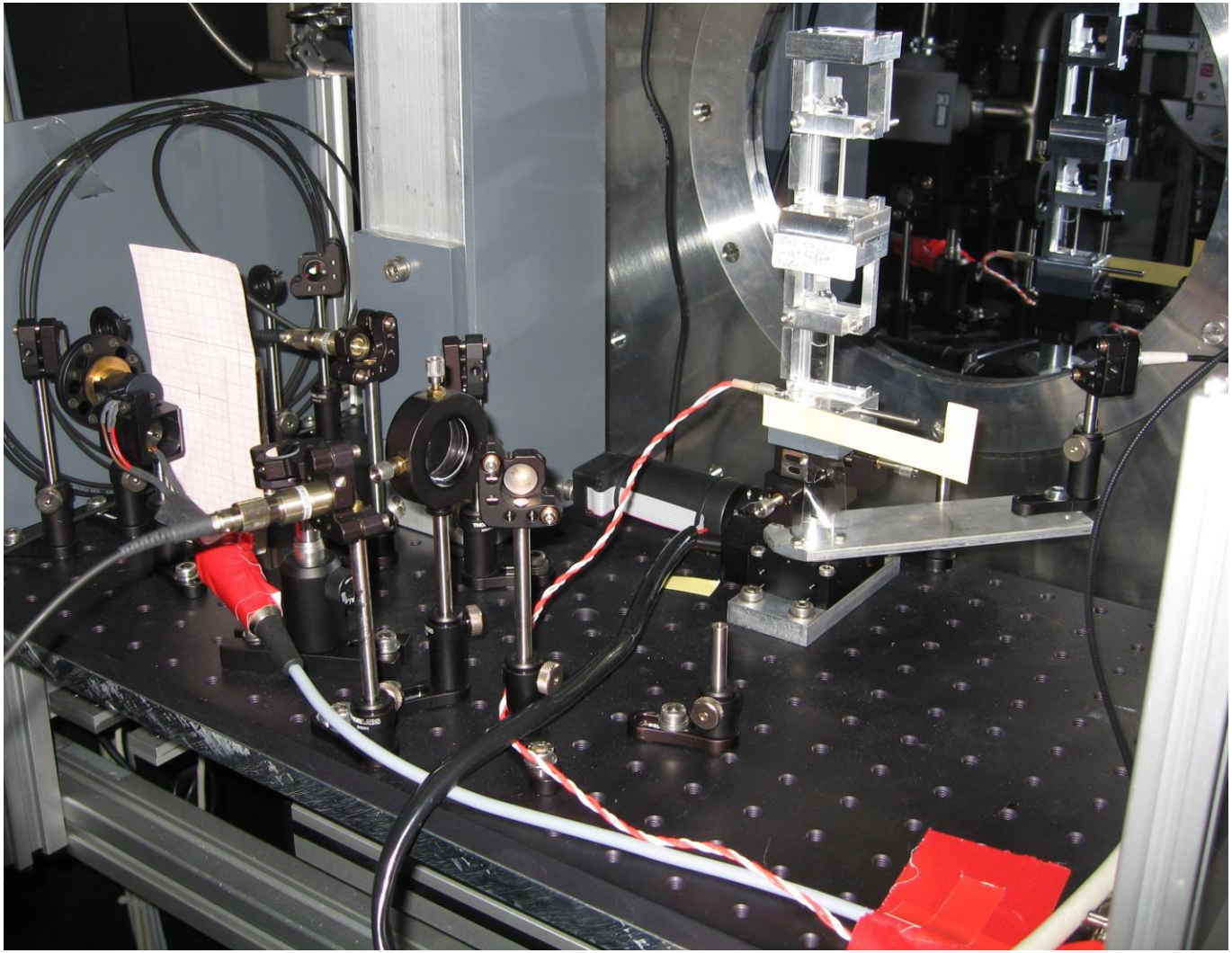
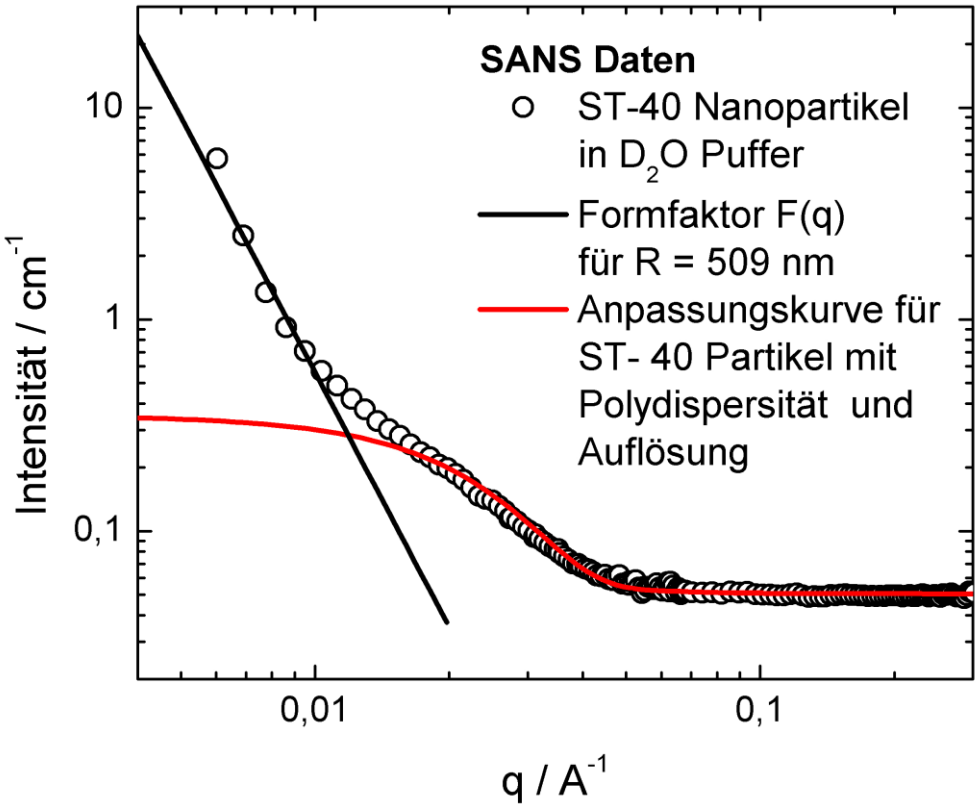


SANS combined with a goniometer type Dynamic light scattering

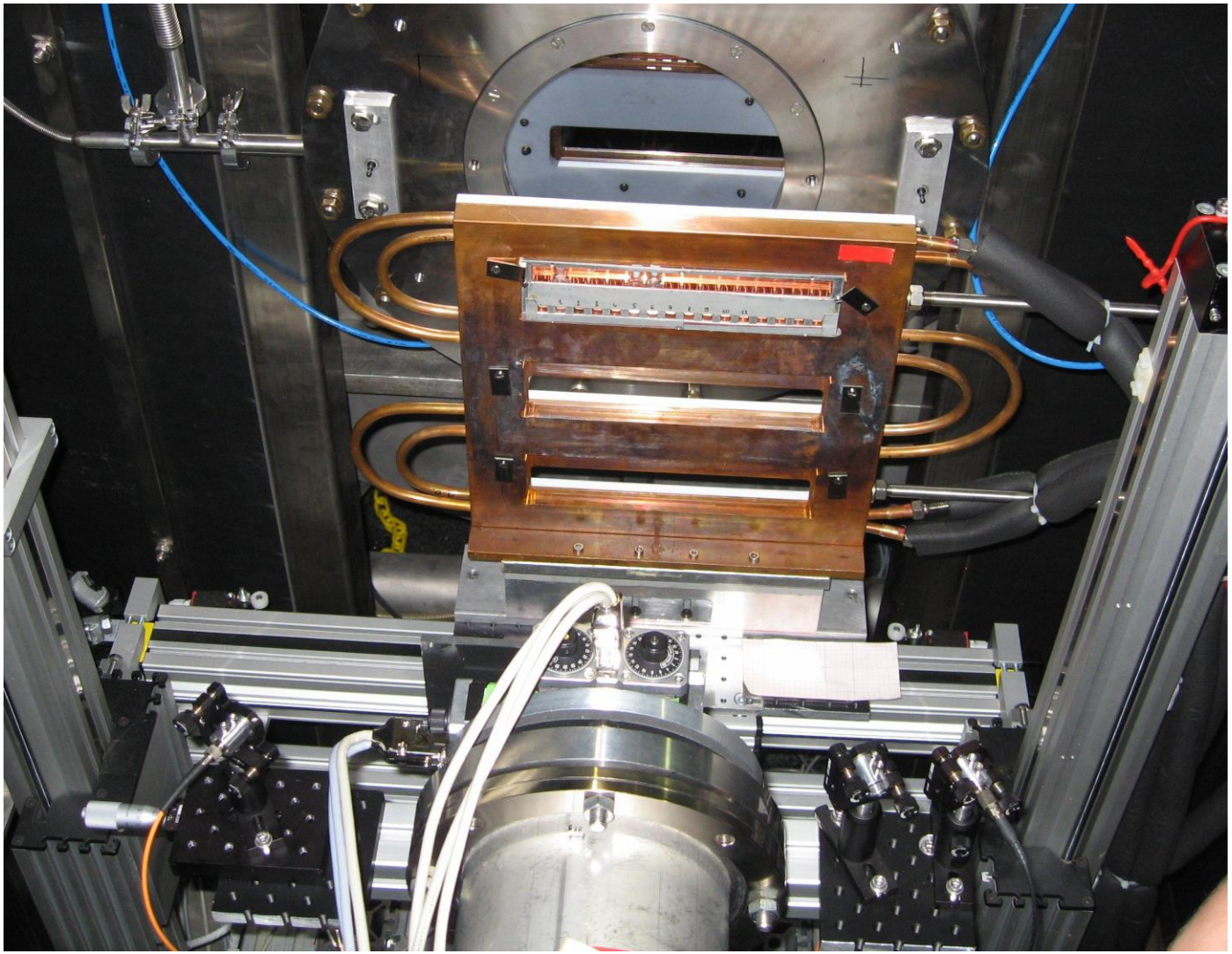


- missing temperature control on the sample cell

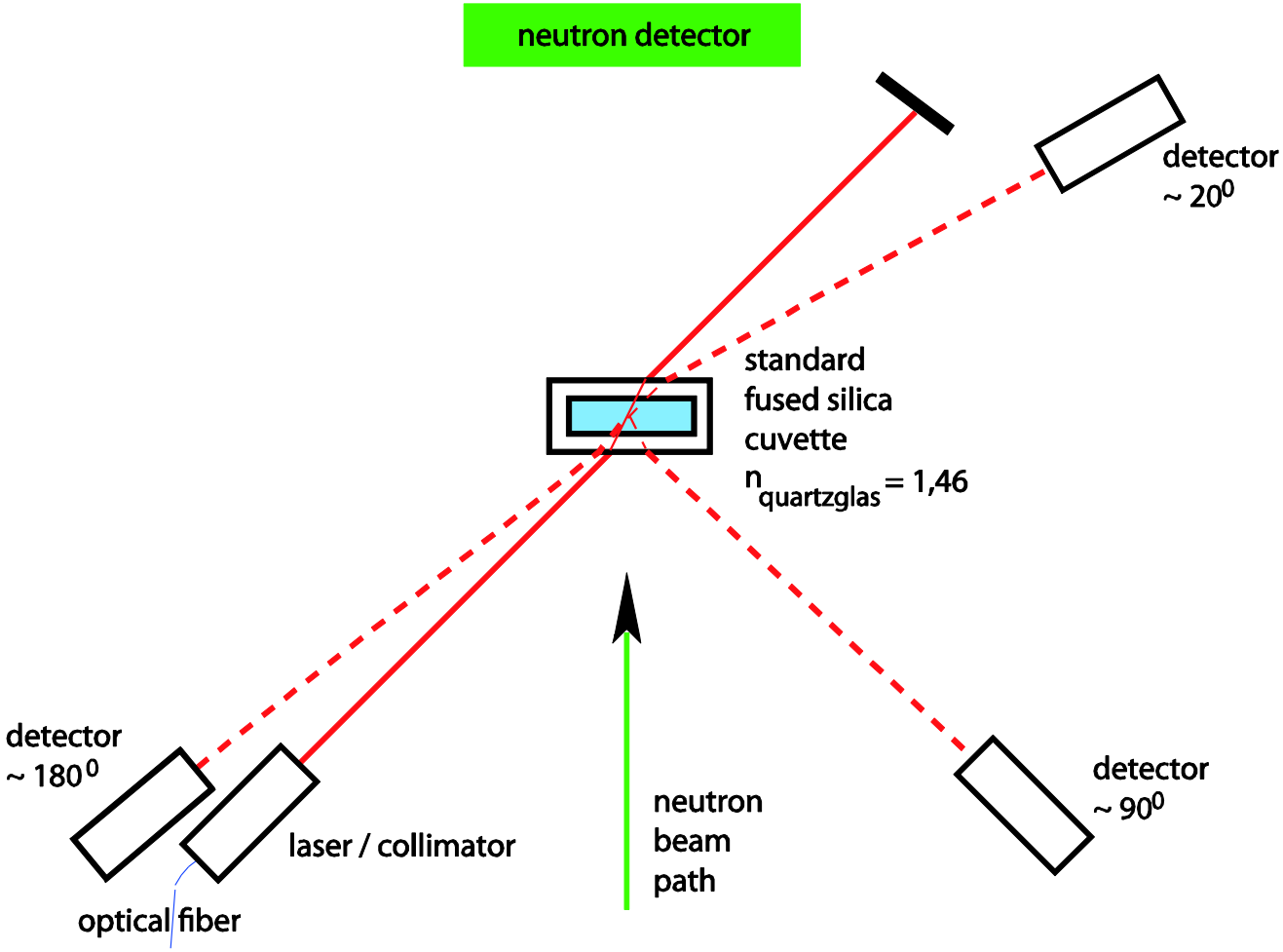
SANS combined with a goniometer type Dynamic light scattering



First test se-up of a two-angle DLS at the final apperture of KWS-2

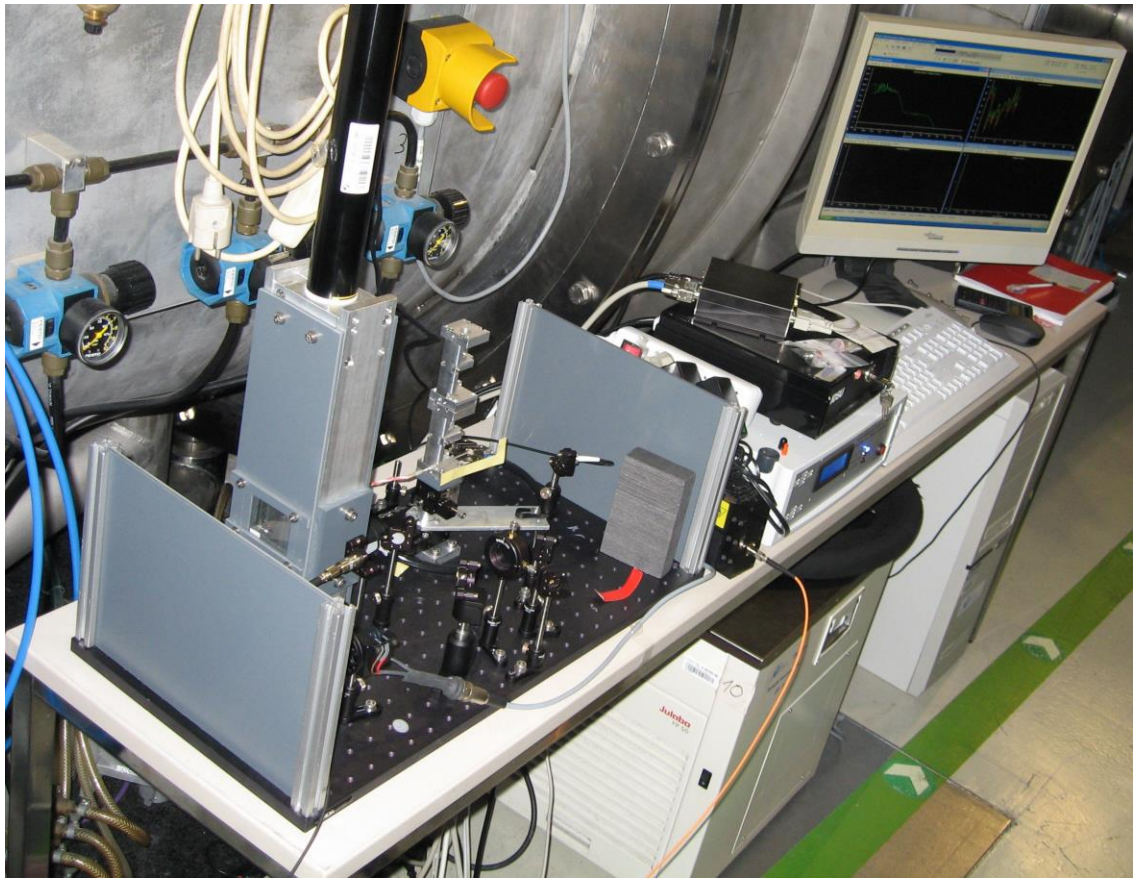


The concept and outlook at that time

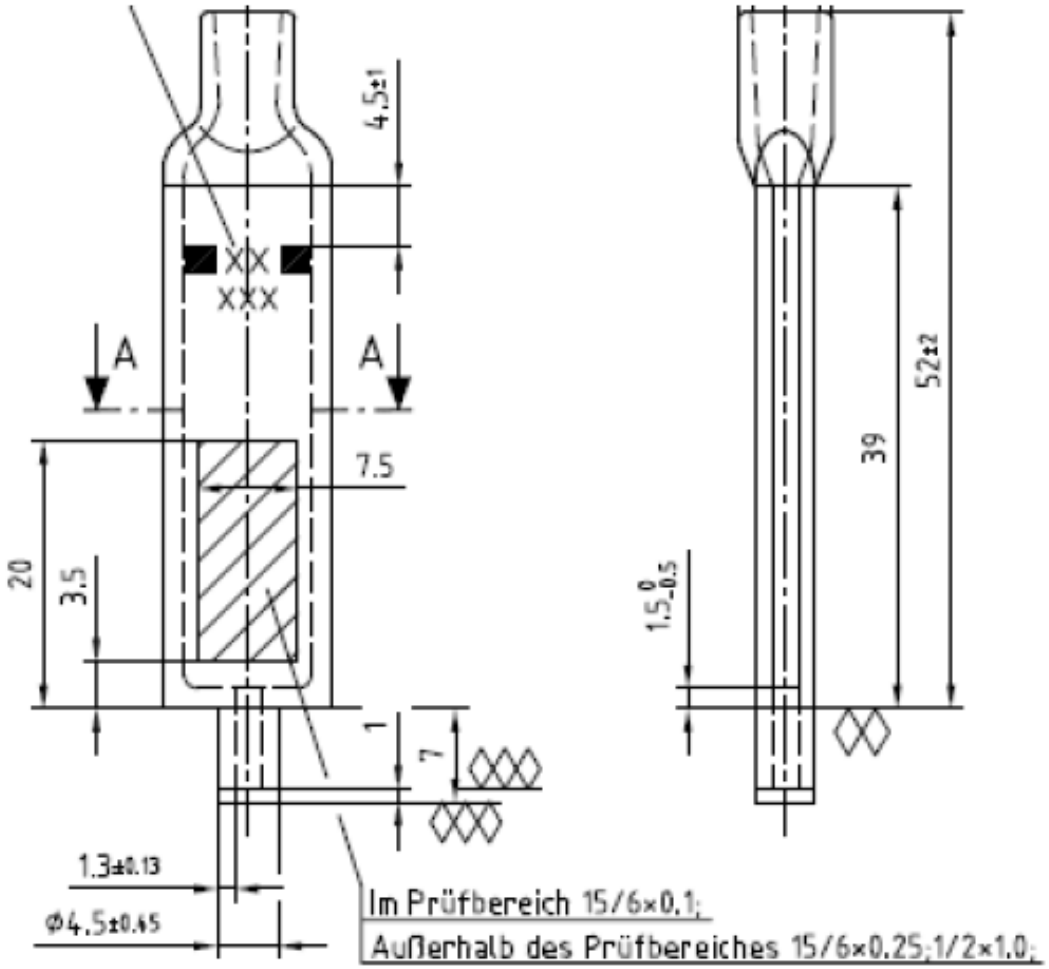


small angle neutron scattering configuration

The laser to fibre coupling set- up on a fixed bench (now moveable)



Some idea to have more angles with the gioniometer



… realized in Berlin now by Thomas Hellweg and his group using 3D DLS to suppress multiple scattering.

Lessons learned….

1. SANS beamtime is very precious and short, one has only 30 min. to install something on the beamline otherwise the user gets nervous and does not want it any more.
2. A close integration into the instrument control software is necessary such that the user does not have to bother with the data saving, file name generation at the added in-situ device
3. The in-situ device should be compatible with the sample preparation for the neutron scattering experiment: Fairly high concentrations, flat quartz cuevettes, 1 cm2 sample area, 1-5 mm sample thickness, sample changer, good temperature control
4. The same in-situ method looks different on different beamlines (e. g. D11, KWS2 have different detector tank flanges).

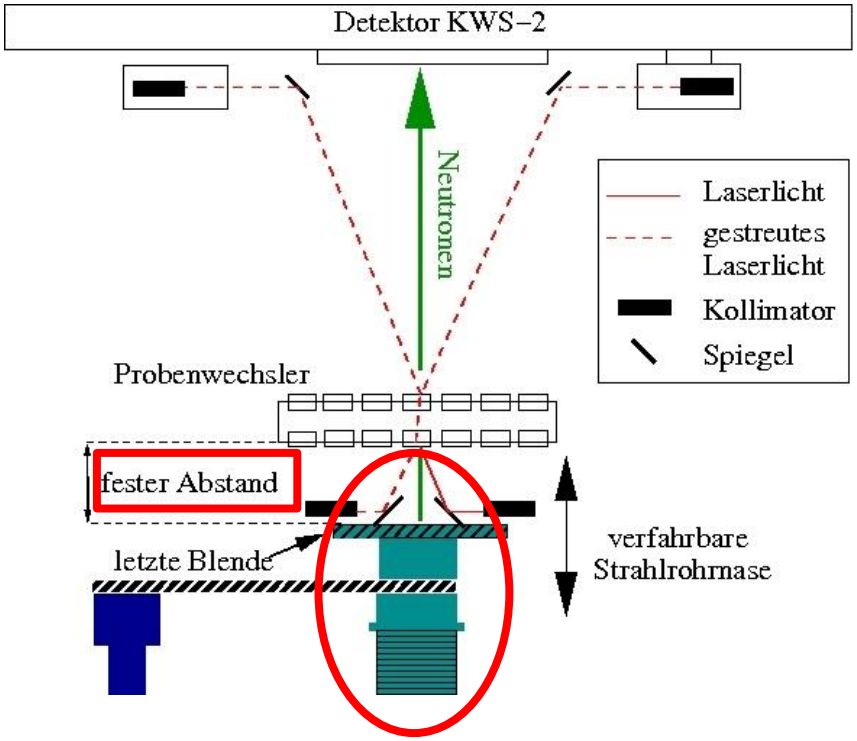
Lessons learned (in the administrative/pratical aspect)

- Man power is essential for progress
- Nice interchange of ideas through EU-funded projects
- Getting to know each other‘s large scale facilities with travel budget from the EU-projects
- Not so critical reporting

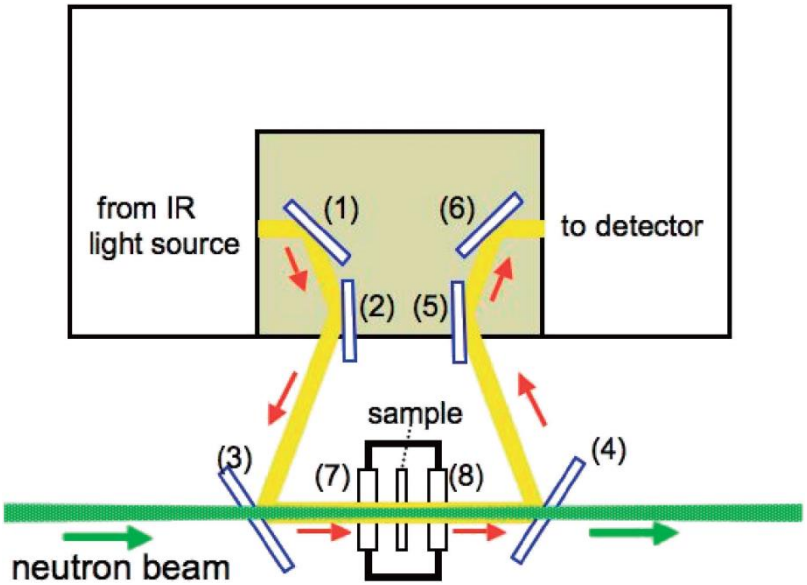
- Good management by Annie Brulet

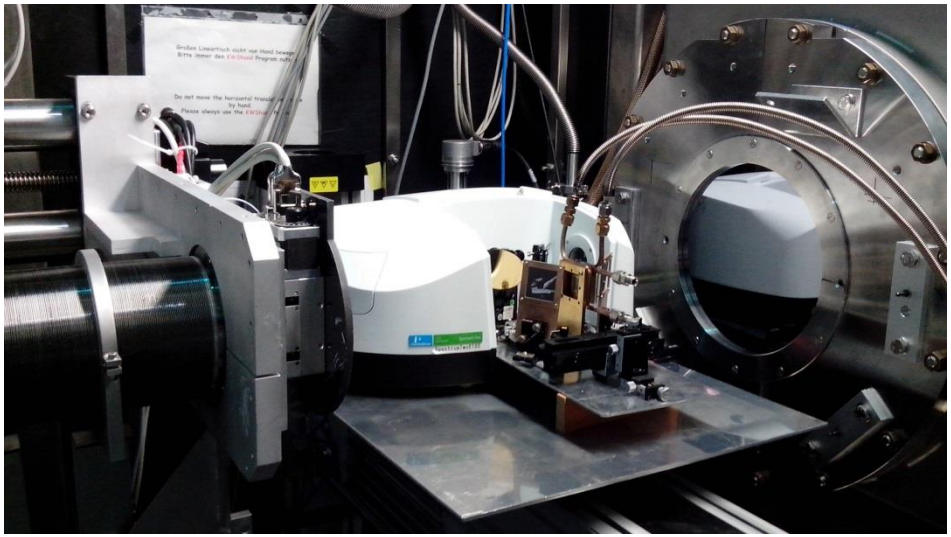
Outlook

- In-situ DLS at KWS-2
  - Additional scattering angles
  - Moving final apperture



Combination of FTIR and SANS





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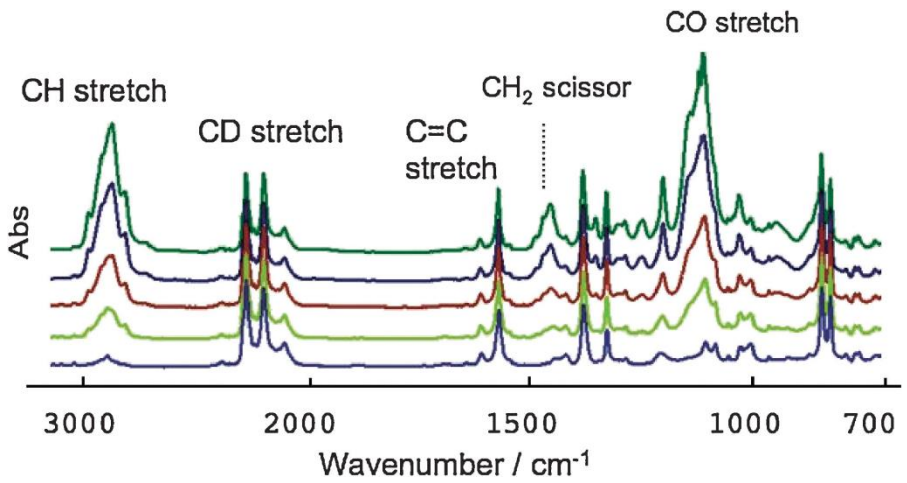

Figure 3. Temperature dependence of FTIR spectra measured in parallel with the SANS measurement on a sPS/TEGDME cocrystal film. The temperatures are 25, 61, 80, 100, and 135 ° C from the top to the bottom.

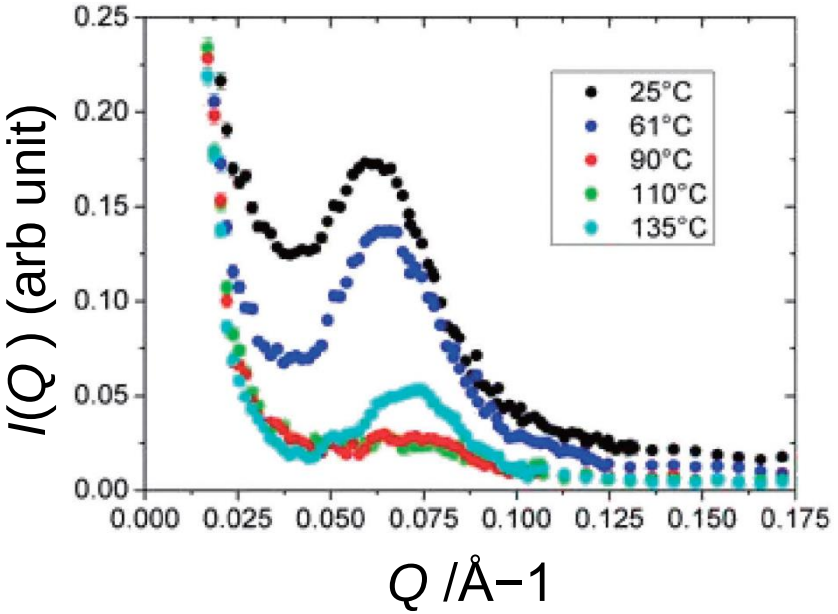

Figure 4. Temperature dependence of SANS one-dimensional intensity functions, I (Q) along the meridian.

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Acknowledgements

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- David Hess
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Thank you for your attention!