



A brief overview of the Bielefeld diffractometer

2015

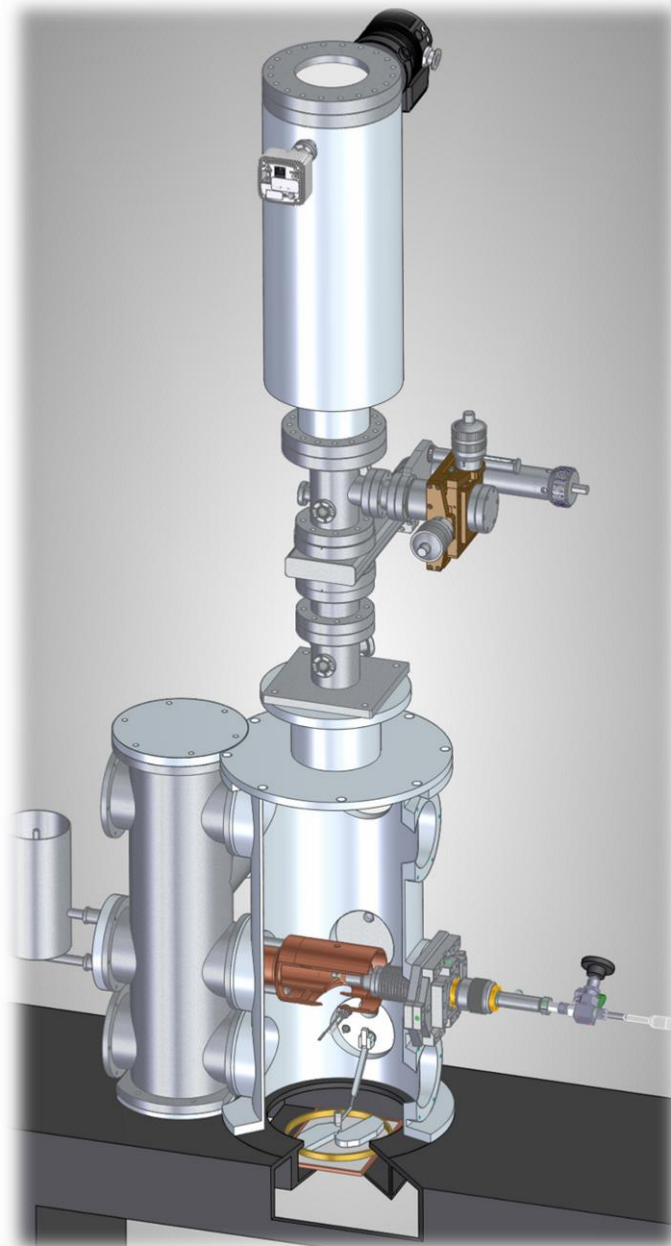
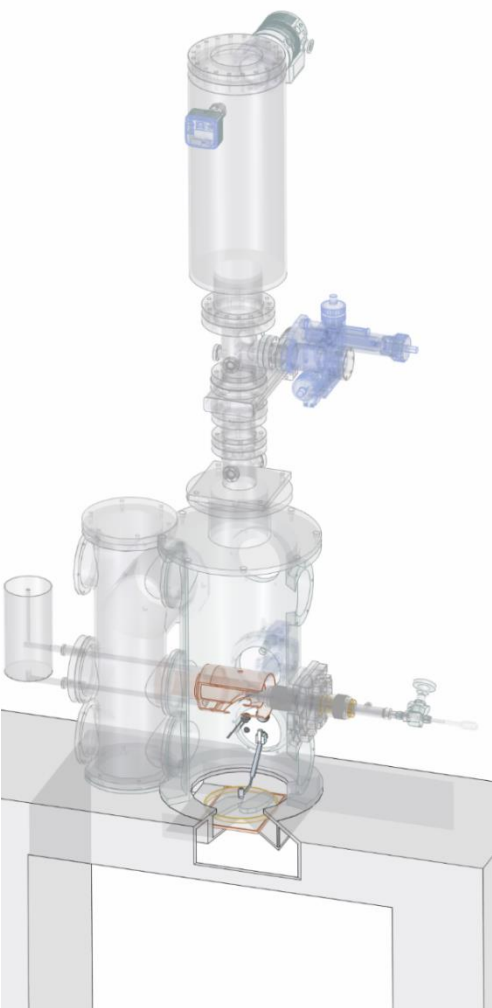


ESGED16 – Frauenchiemsee Germany

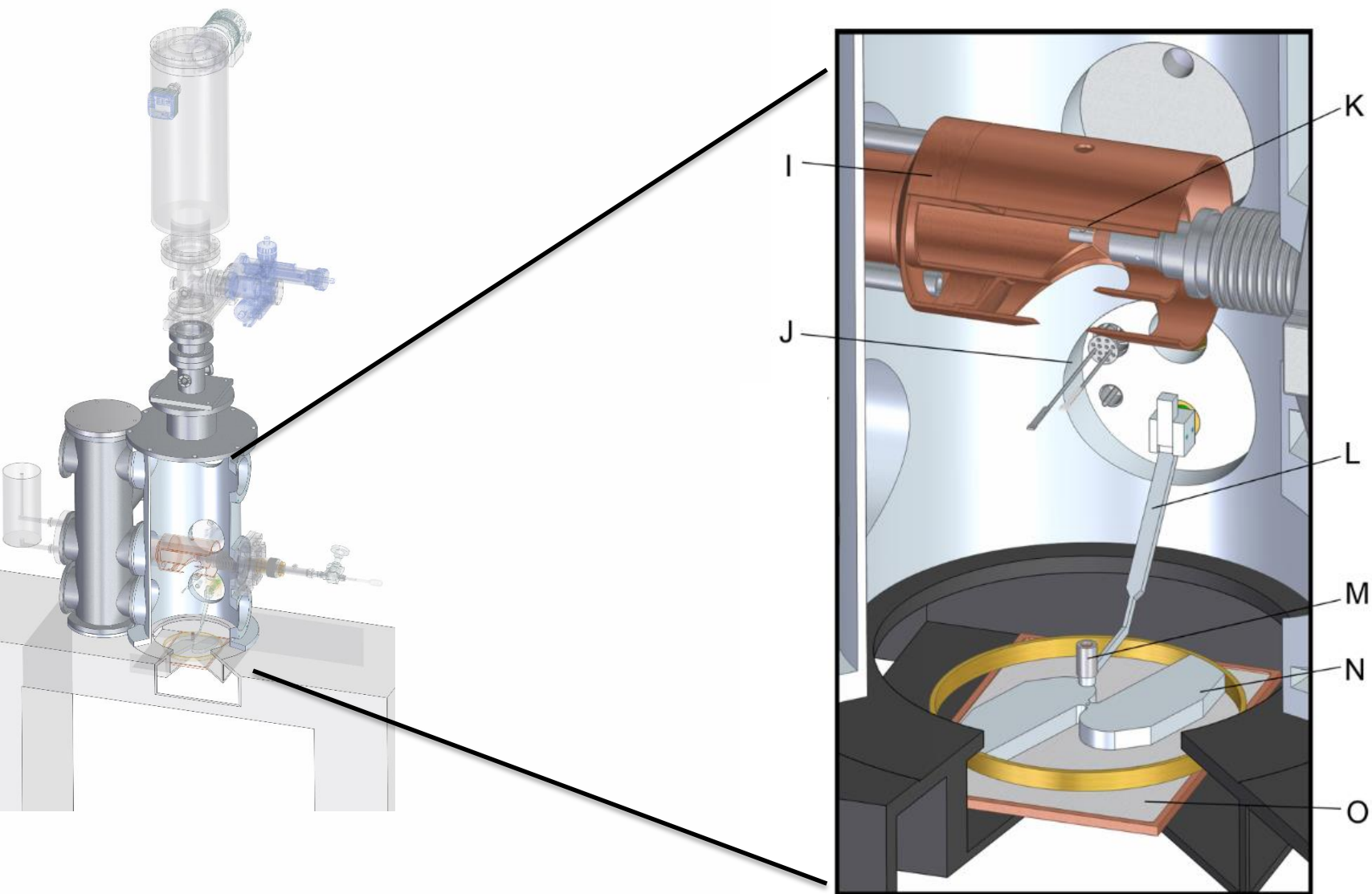
Christian G. Reuter

MAINZ = Landeshauptstadt
Fürth = Sonstige Städte
● Städte über 500.000 Einwohner

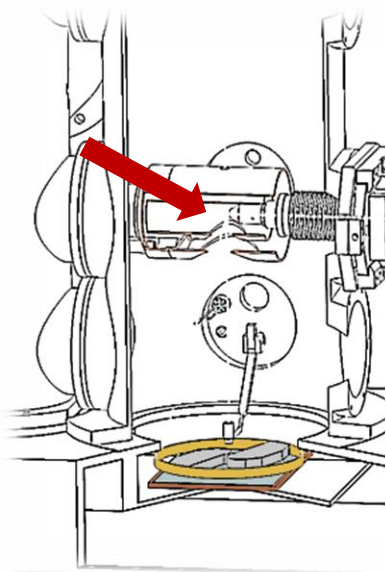
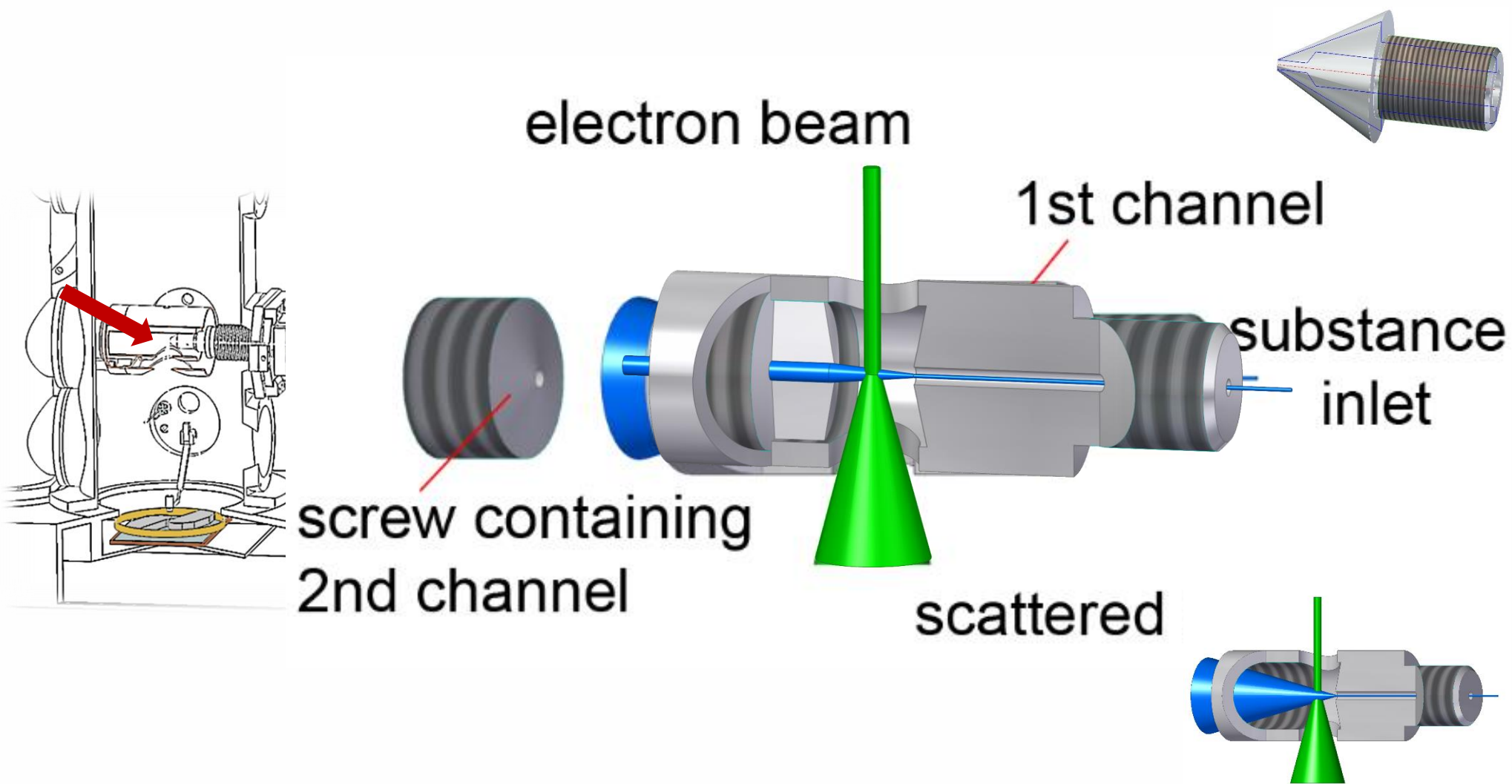




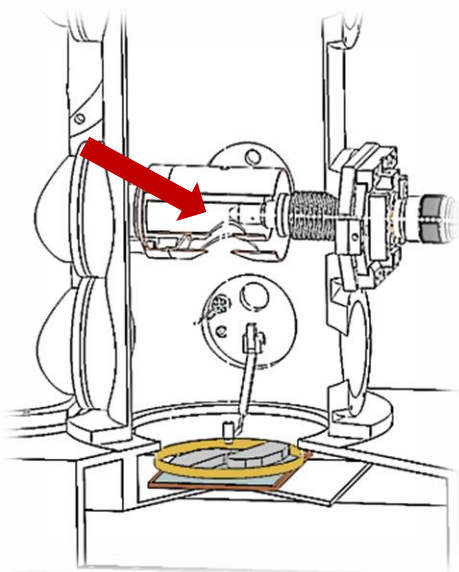
Diffractometer in Bielefeld

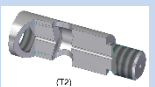
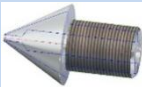
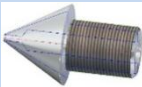


Nozzle tips

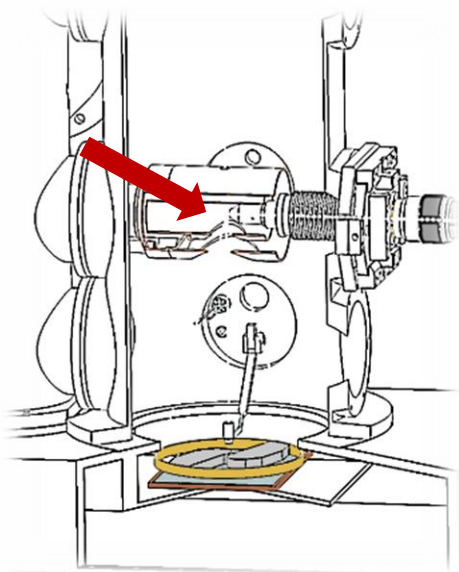


Tip testing with CCl₄

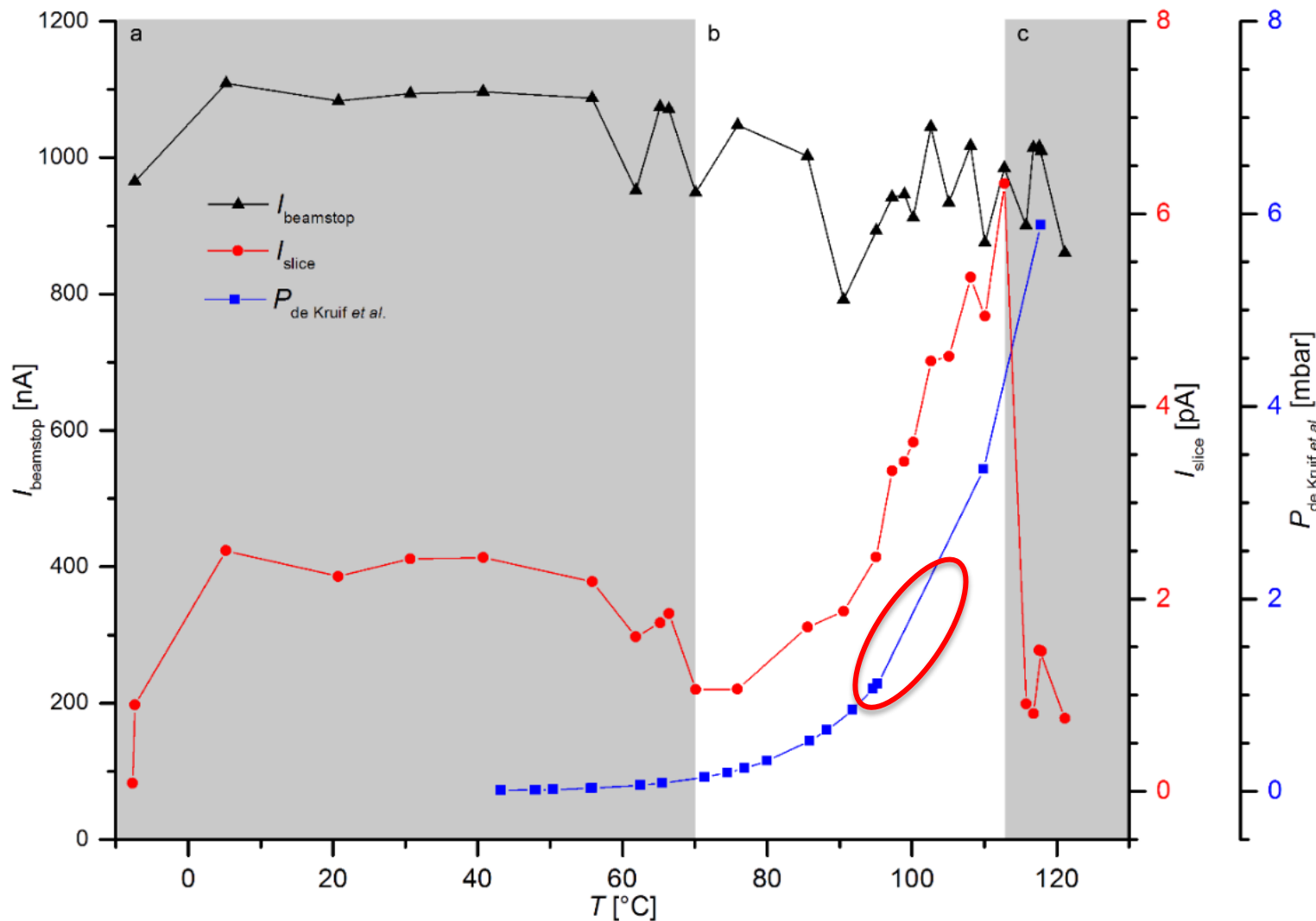
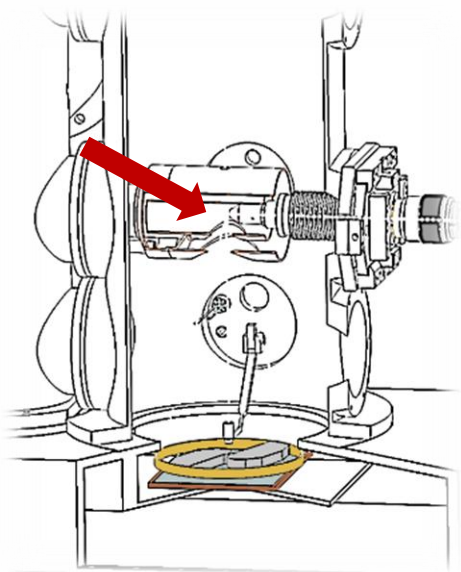


Parameter	SMC T2 	SMC T1 	SMC T1 	Morino, ^[10] 1960	Shibata, ^[12] 1974	Petrov, ^[13] 1985	Vogt, ^[14] 2011
Error limits	3 σ	3 σ	3 σ	1 σ	2.5 σ^b	— ^c	2.5 σ
$r_g(\text{C-Cl})$, Å	1.7693(3)	1.7659(4)	1.7662(3)	1.7667(30)	1.7670(16)	1.769(4)	1.7671(13)
$r_g(\text{Cl-Cl})$, Å	2.8871(5)	2.8815(6)	2.8820(5)	2.8881(30)	2.8879(18)	2.890(4)	2.8883(7)
$l(\text{C-Cl})$, Å	0.0484(13)	0.0475(14)	0.0471(12)	0.0505(20)	0.0486(17)	0.056(3)	0.0482(17)
$l(\text{Cl...Cl})$, Å	0.0688(7)	0.0682(8)	0.0676(7)	0.0696(10)	0.0702(9)	0.072(2)	0.0700(10)
R_f , %	3.49	4.22	3.20	—	—	—	4.5

Effusion cell



Effusion cell

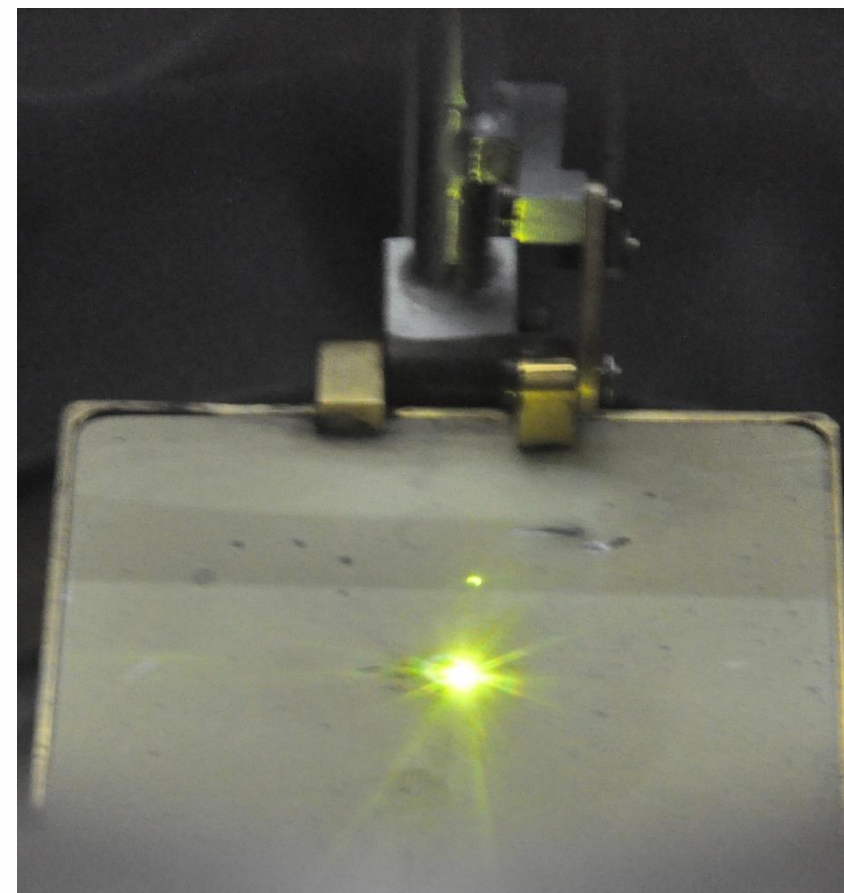
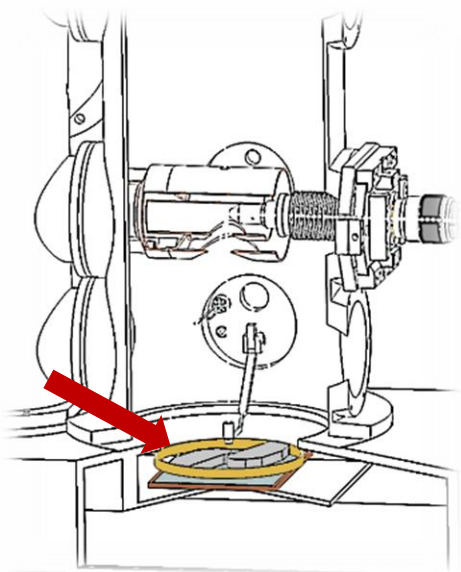


de Kruif, Blok, *J. Chem. Thermodyn.* **1982**, *14*(3), 201–206.

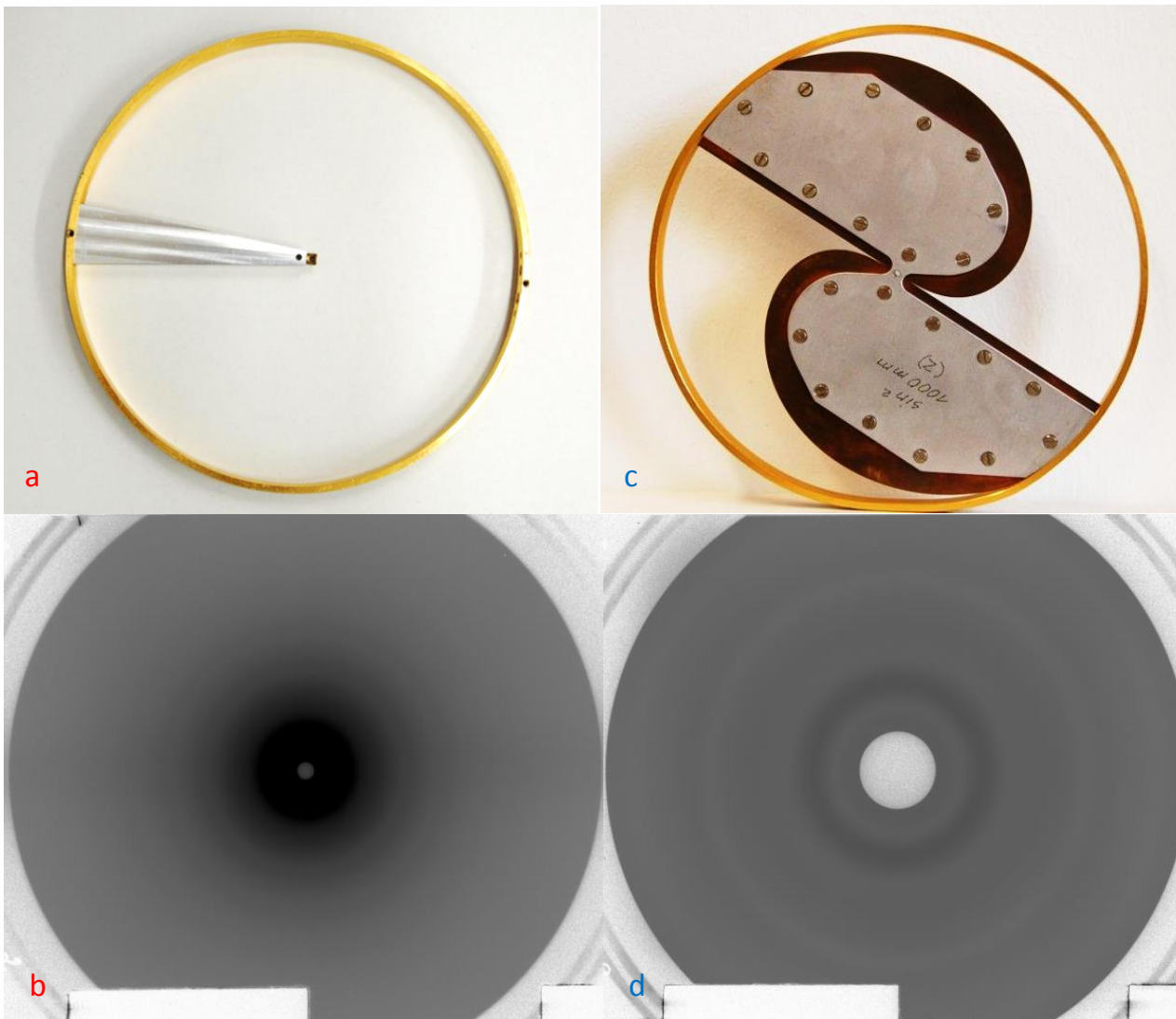
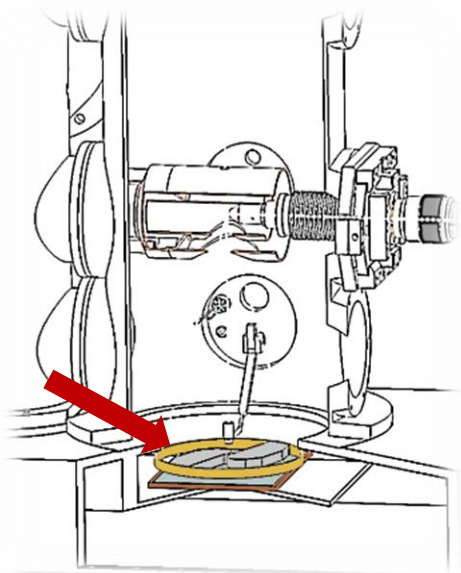
Aarset, Page, Rice, *J. Phys. Chem. A* **2006**, *110*(28), 9014–9019.

Sector

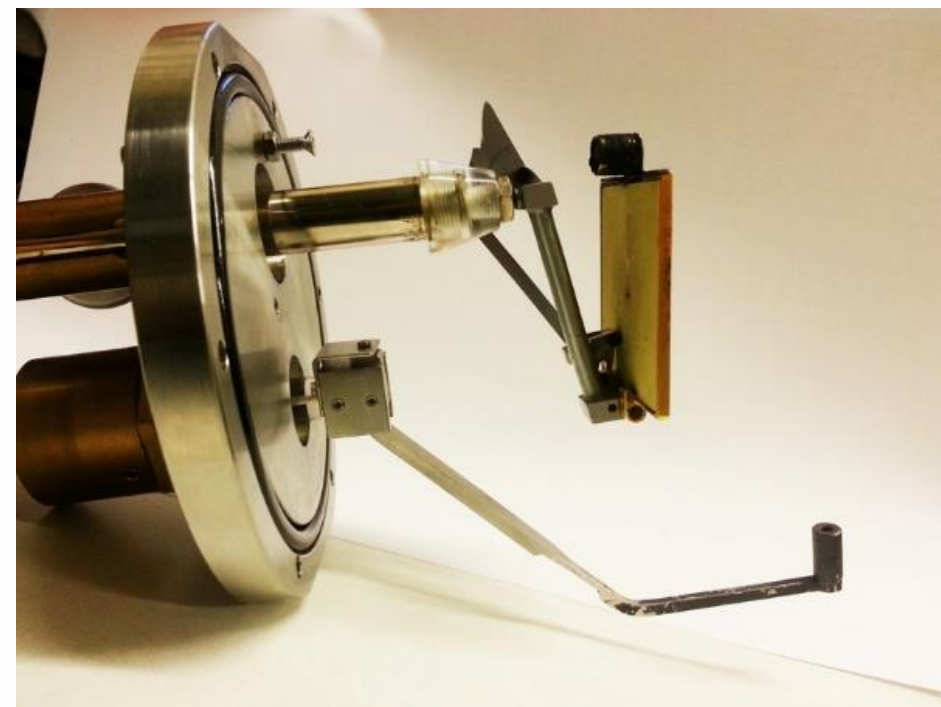
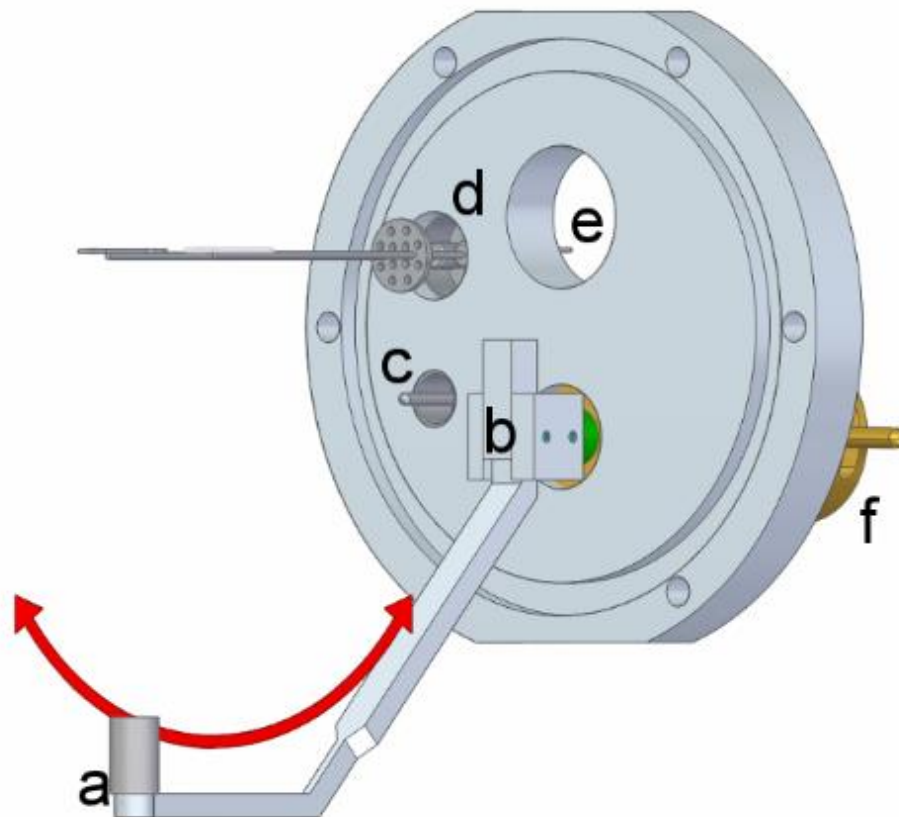
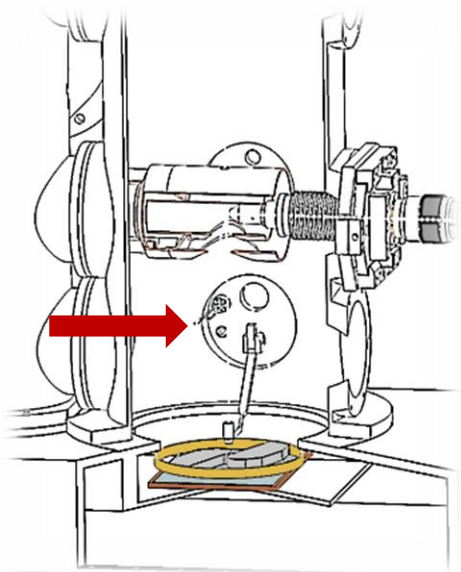
beam alignment



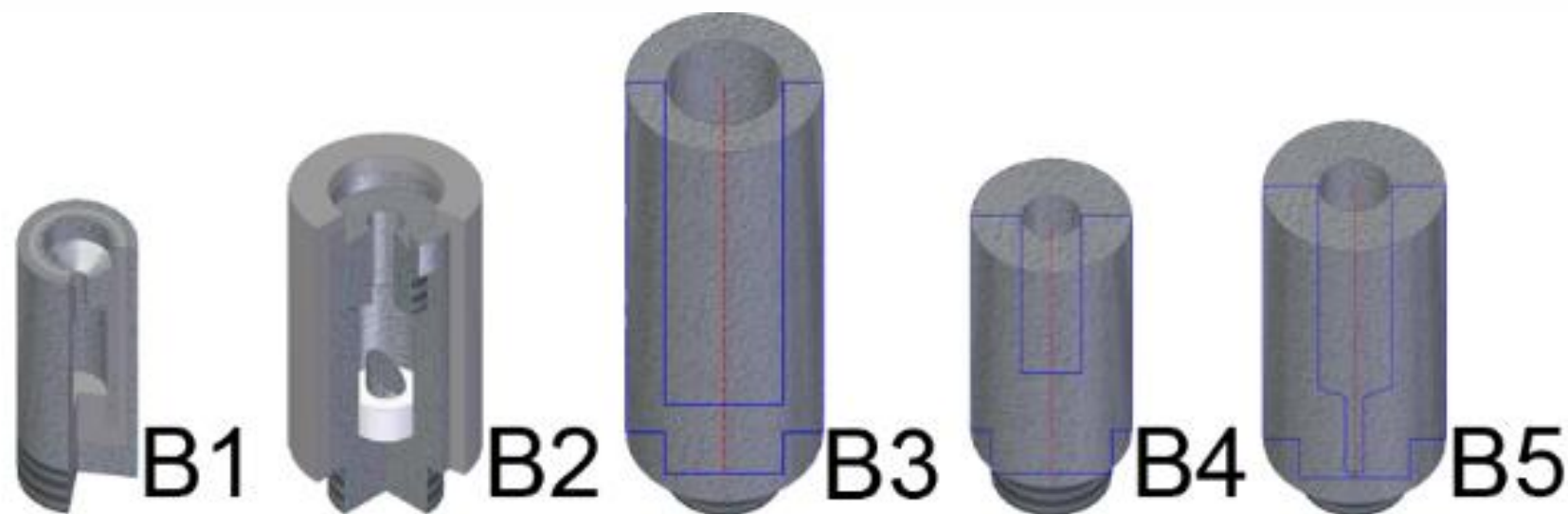
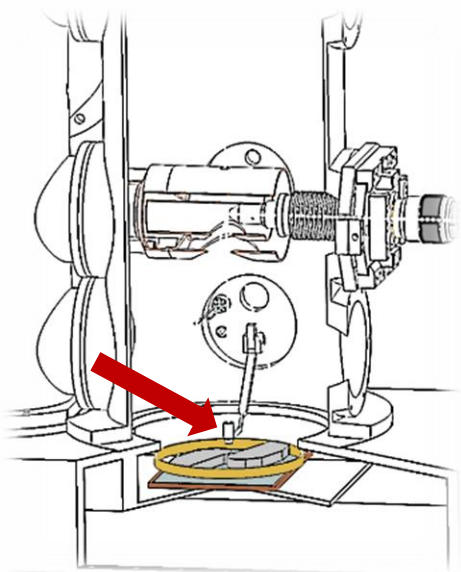
Sector



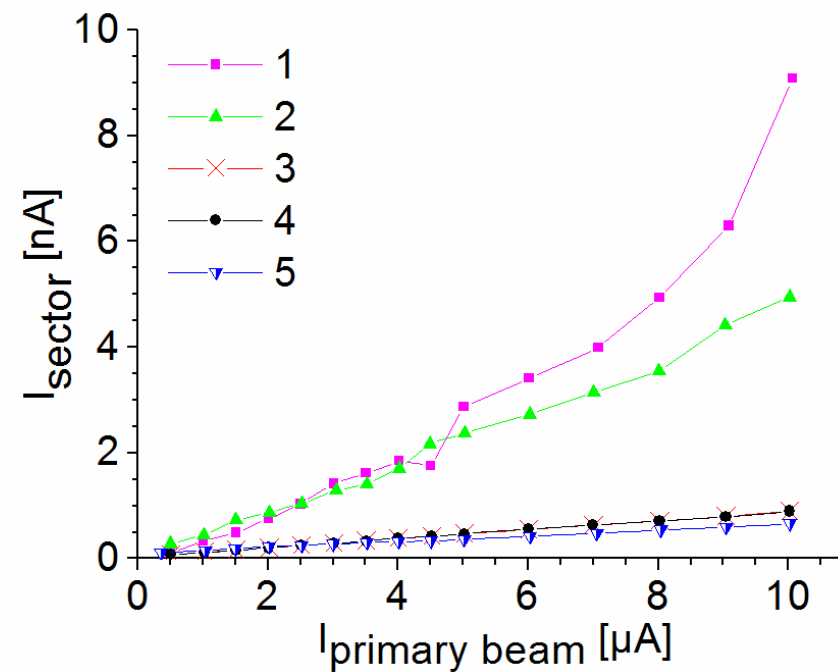
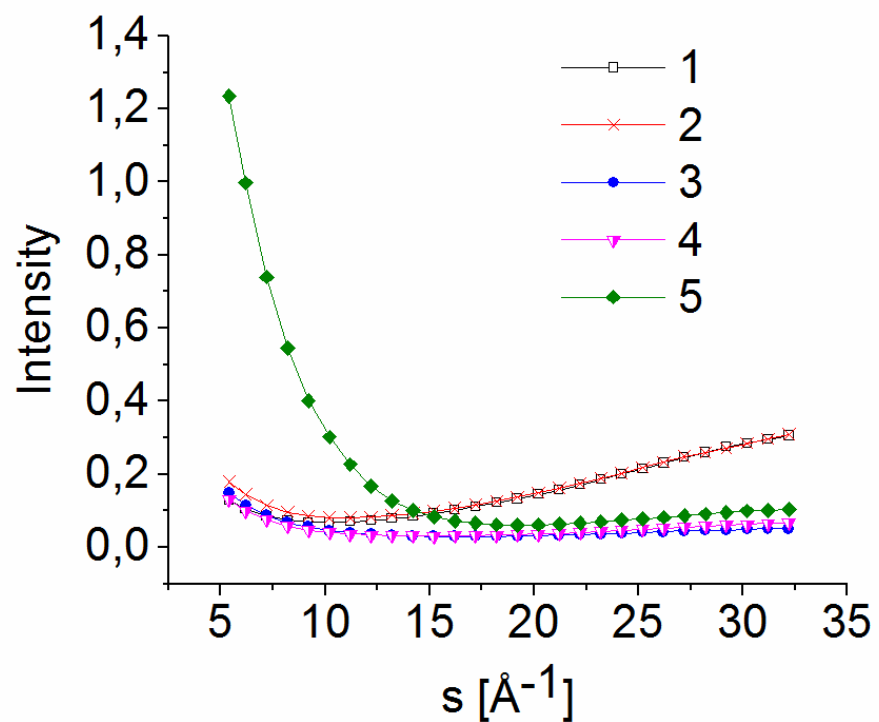
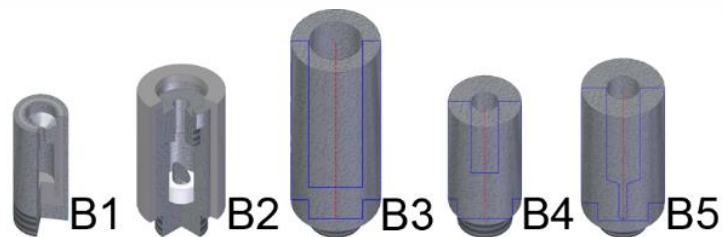
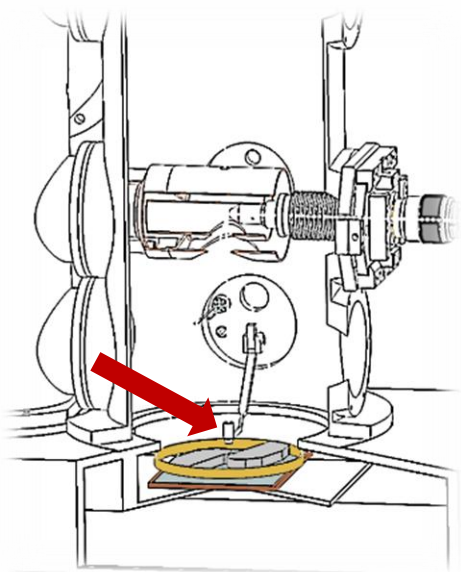
New beam-stop carrier



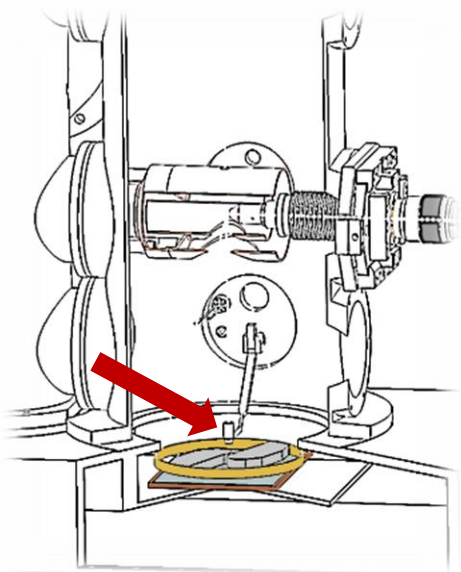
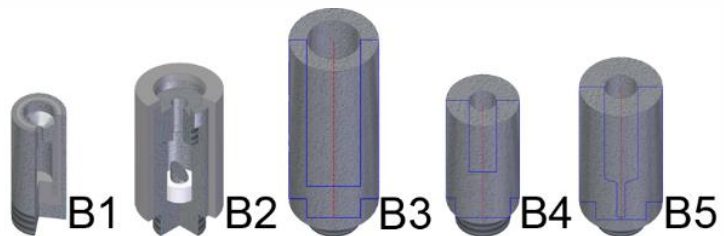
Beam-stop architectures



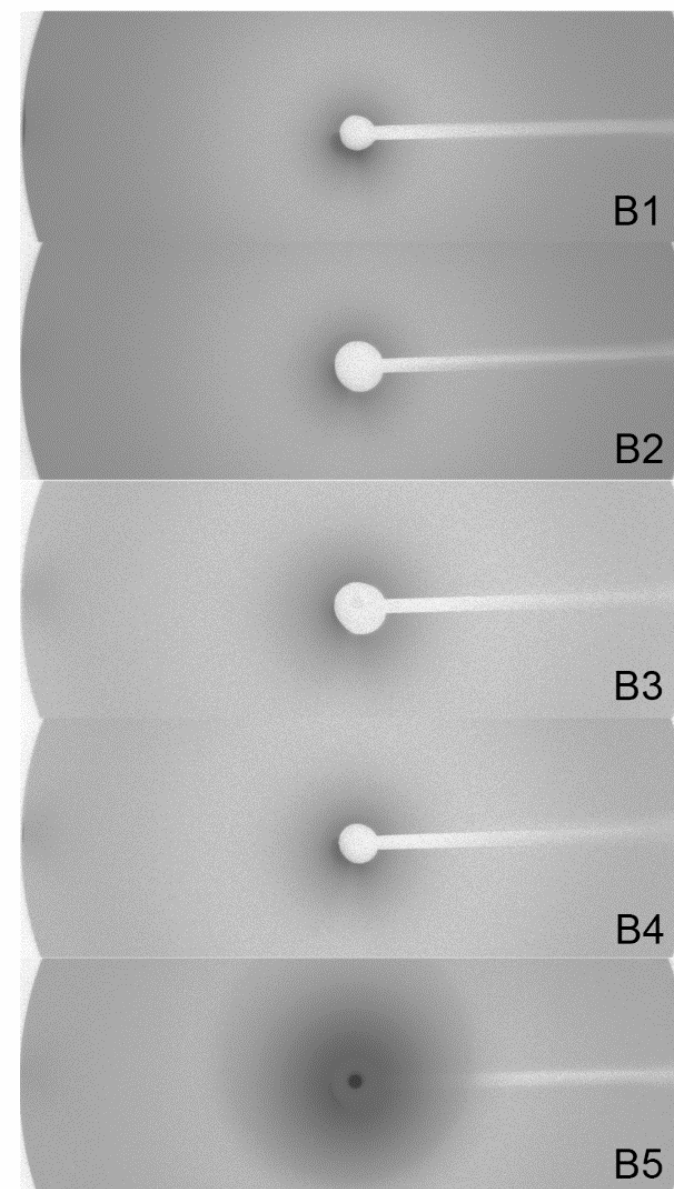
Beam-stops



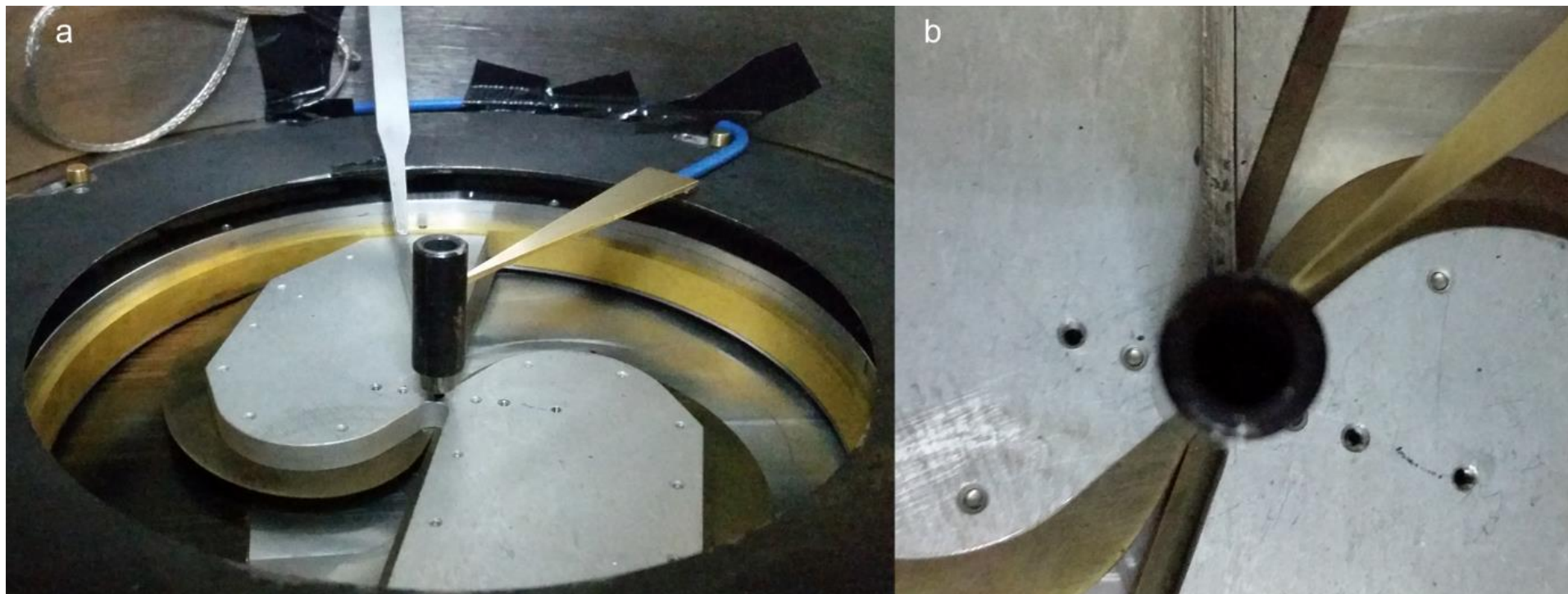
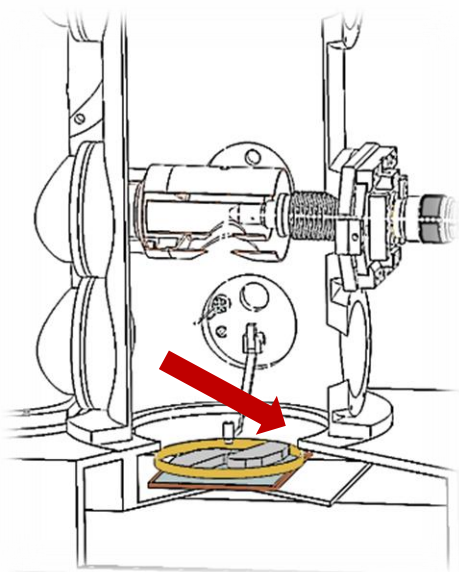
Beam-stops



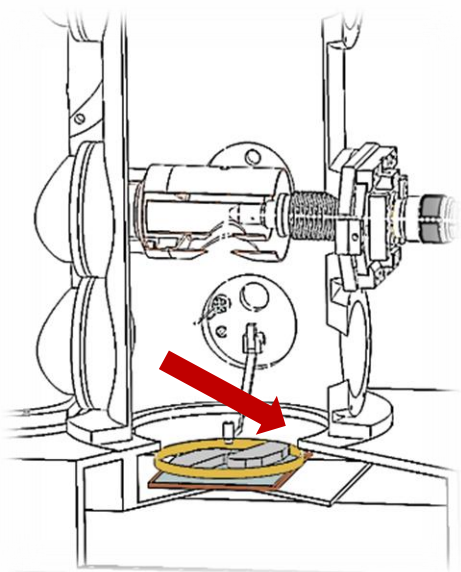
	s_{\min} at MC	s_{\min} at LC
2011	6,2	2,0
2015	4,2	1,6
MC = 250 mm; LC = 500 mm Data of C_6H_6		



Scattered electrons

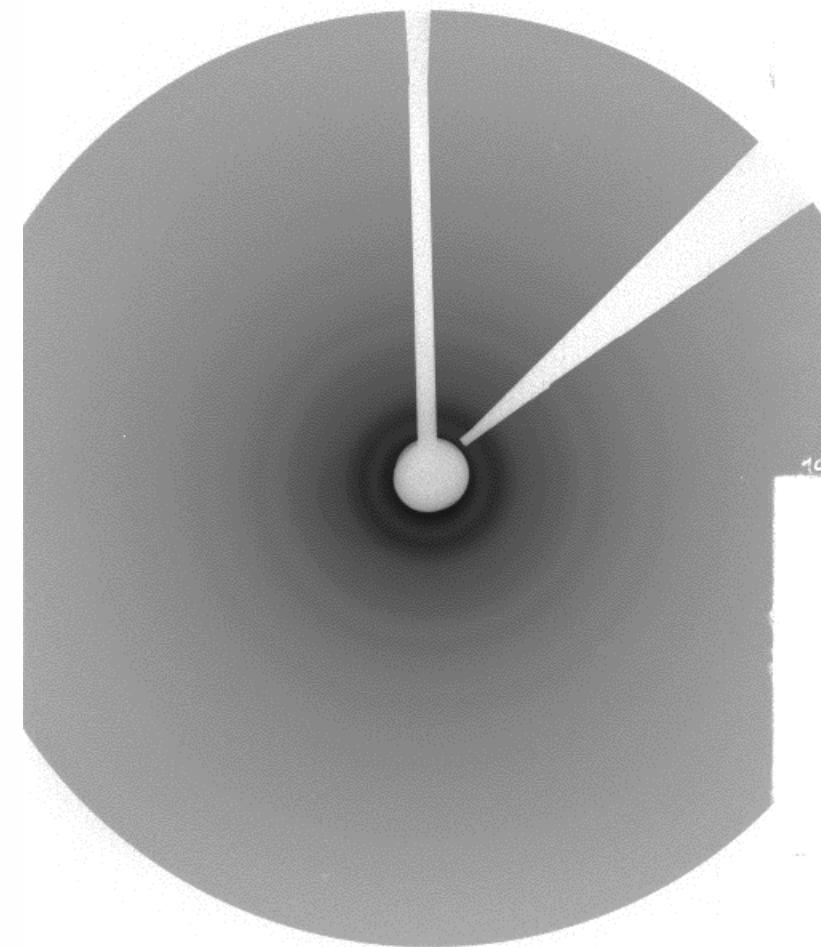


Scattered electrons

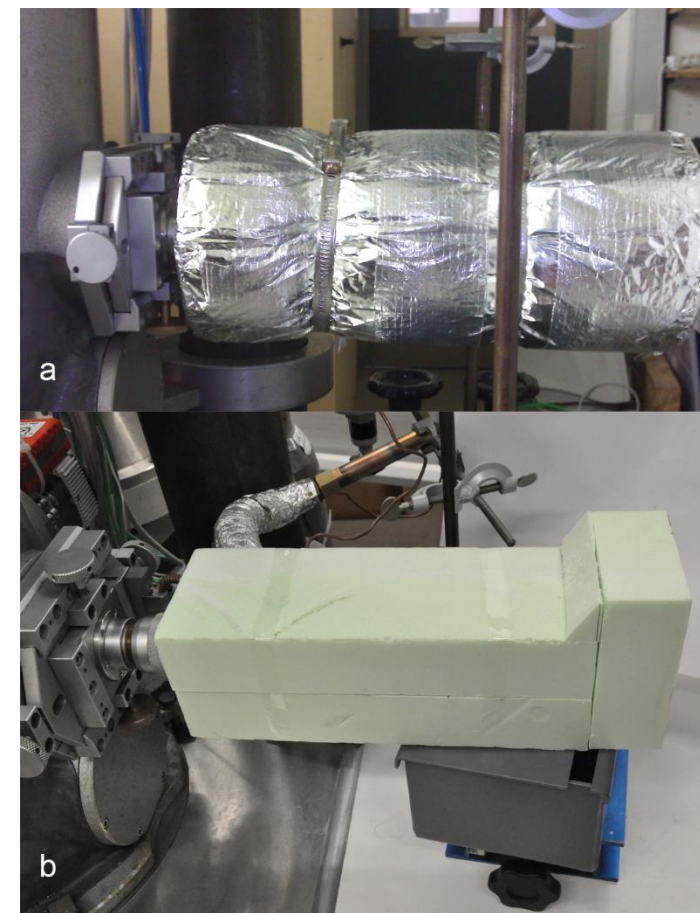
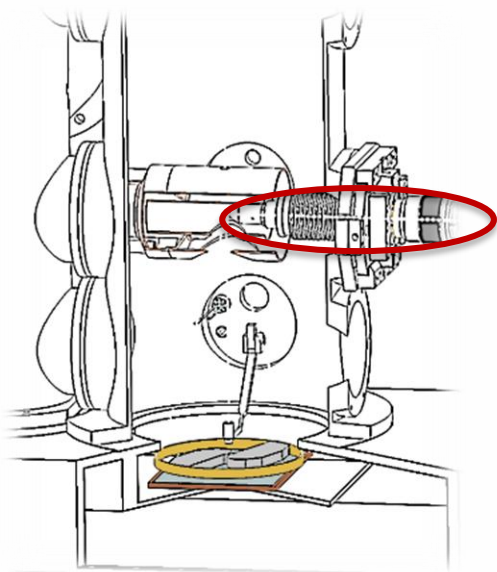


0.04 pA in idle mode

-> ~10 pA with sample

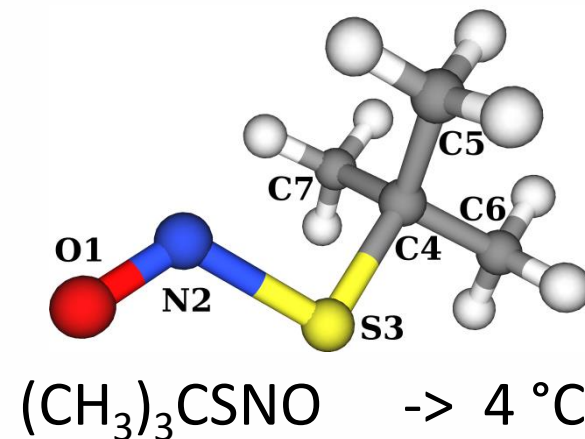
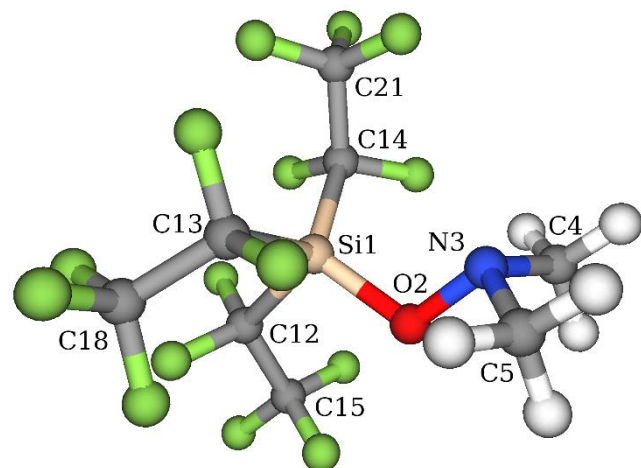
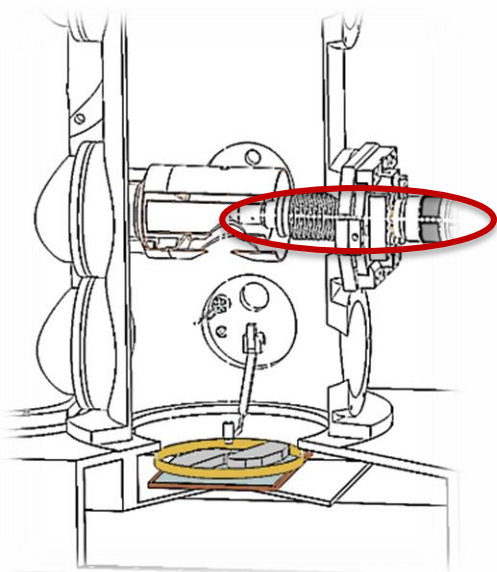


Cryo GED



Low temp GED

→ -30 °C

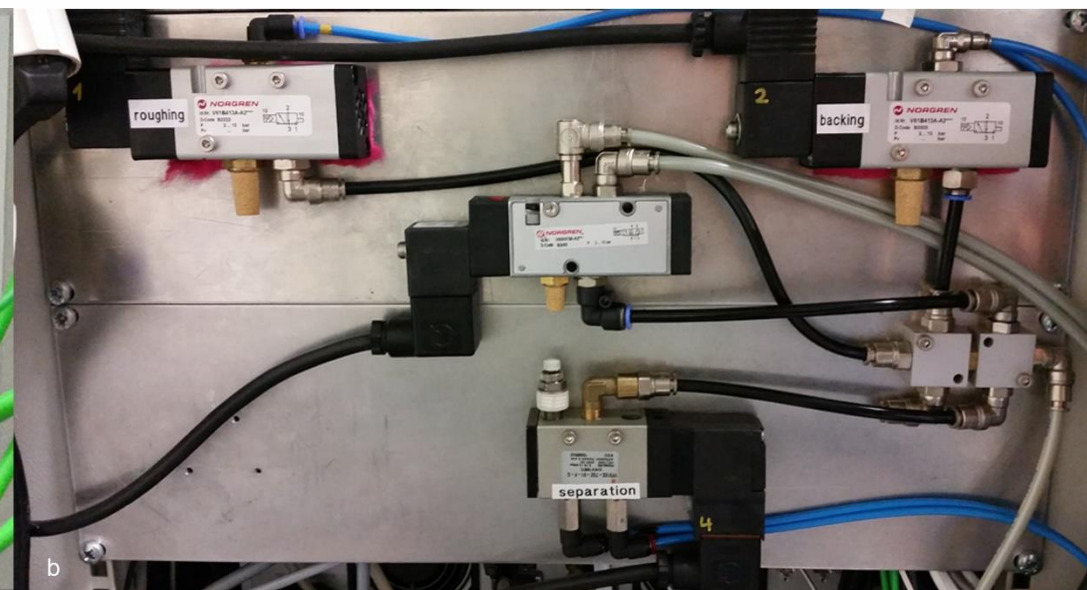
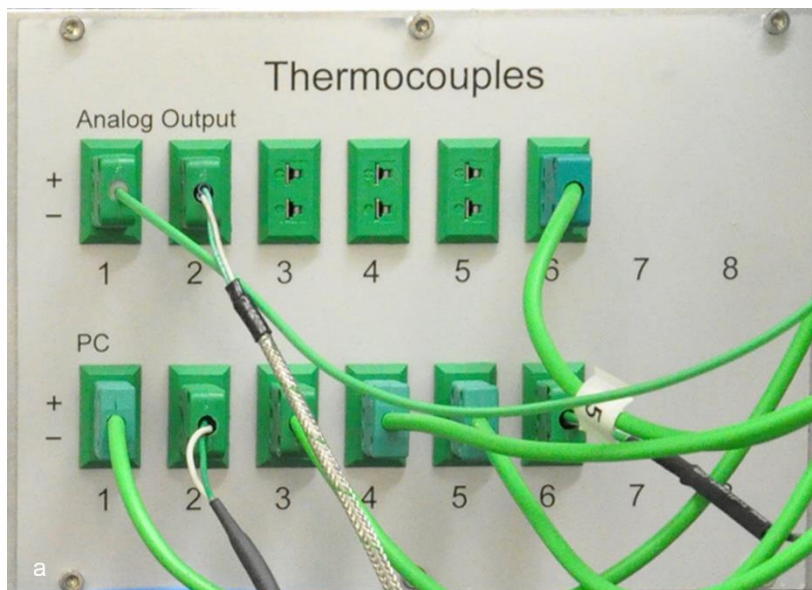
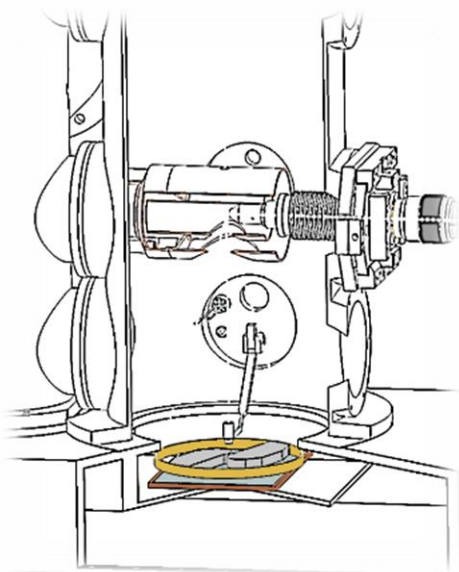


400 °C

Connectors

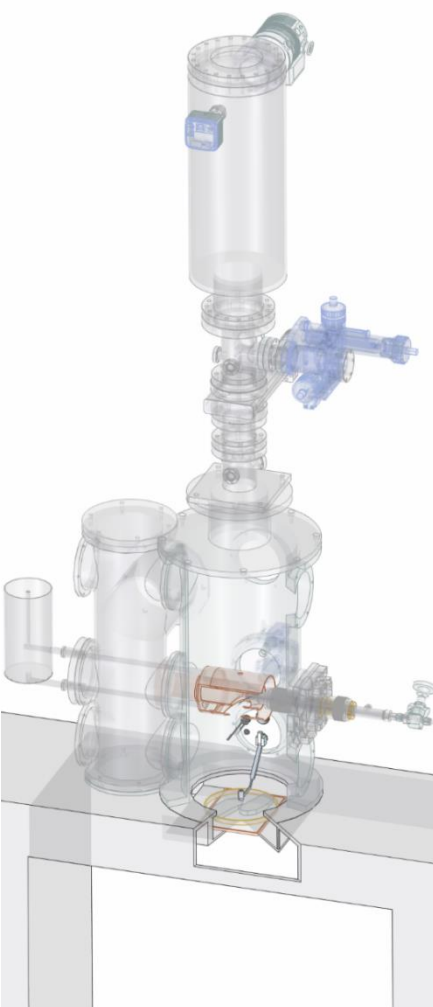
Thermocouple switchboard

Valve switchboard



beam current
scattered current

Control panel on touch screen



QUIT

Aperture: 50 μm

Acceleration voltage: 60 kV

Filament current: 1.5 A

Sector: 2. sin2

Beam Stop: 3. small narrow blank

Background reduction:

- Wunderrohr
- Brass Plate
- Reuter Rohr
- Sector cover
- N2 cooling

Distance: 2. short

Nozzle: 1. High temperature

Nozzle tip: 1. jet 0,9 --> 0,9

Flask type: 1. Young short neck

Measured by: CR

Path to save data: d:\#measurements\

Compound:

Comment:

Exposure time: 5 s

Plate No. Experiment Recording

00 **START** Timer

Record without timer start Data only, no Plate sector not spinning

00:01:23
22.04.2015

Keithley control

2100 (HV)

init end

6485 (BeamStop) 6514 (sector)

init end init end

Beam output current

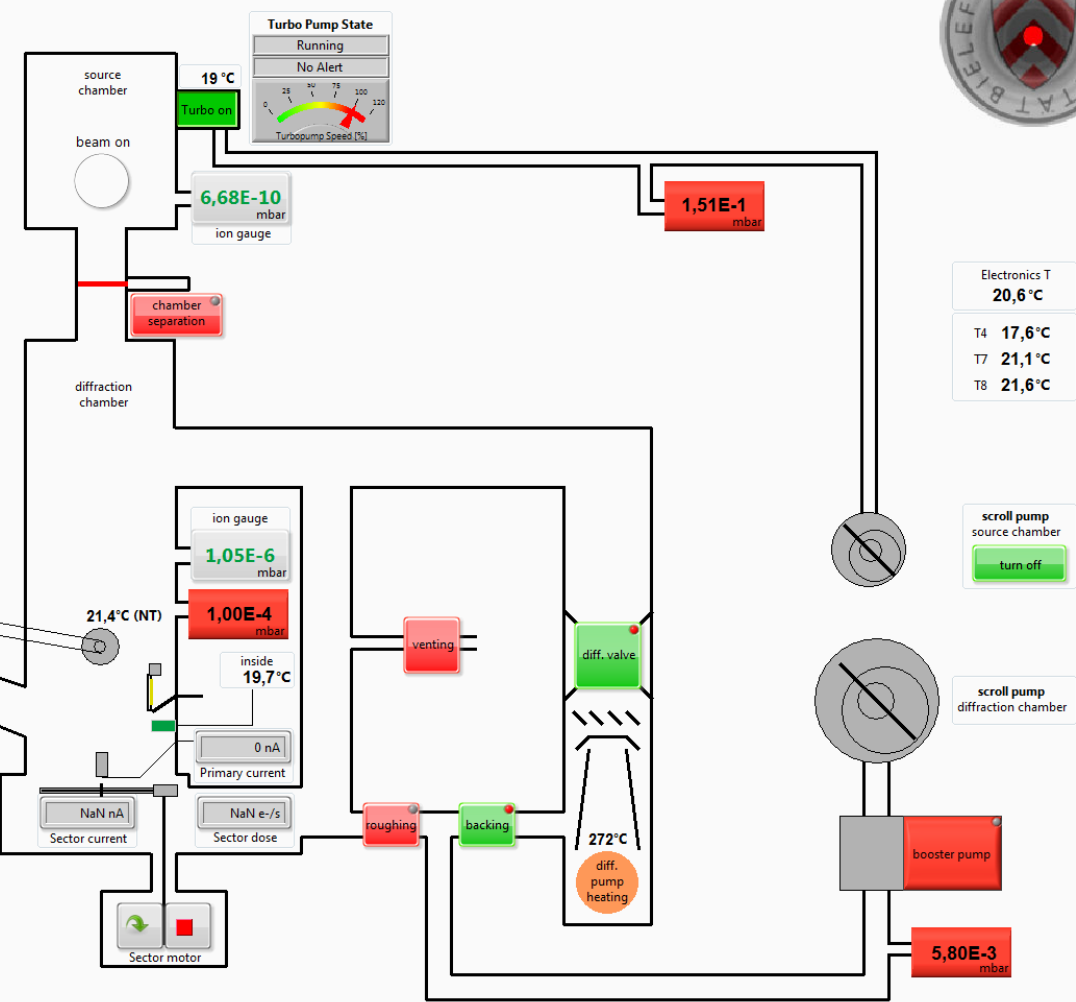
measured: 0 mV

calculated to: 0 mA

sample valve

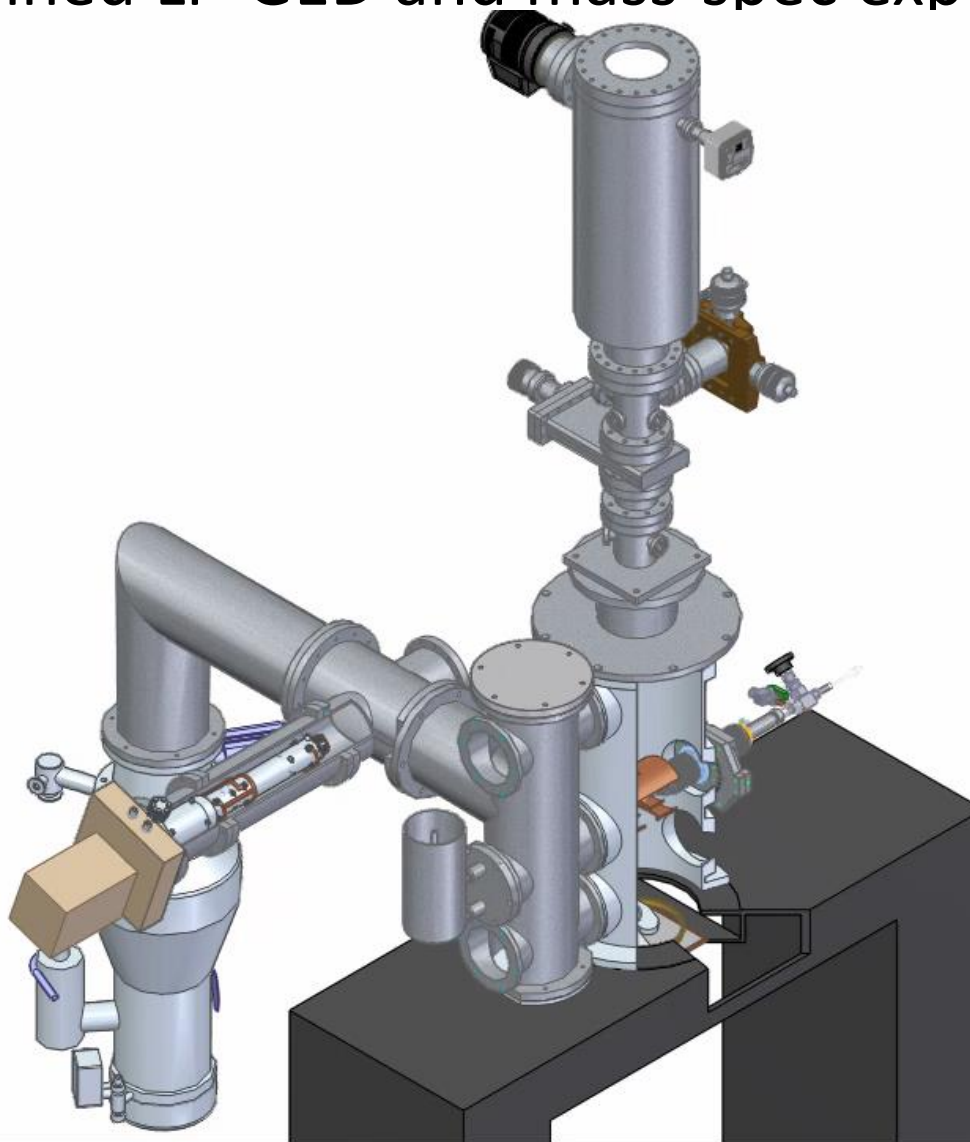
-36,5°C (ST)

hot air cold air



combined LP-GED and mass-spec experiment

- pumps
- beam-stop
- beam-stop carrier
- cold trap
- mass spec
- cryo
- LP-GED nozzle
- **PC control**



- sensors for
 - prim. beam
 - scattered e^-
 - Temperature
- control electronics
 - valves
 - switches
- ...



Greetings from Bielefeld