



Wir schaffen Wissen – heute für morgen

## **Paul Scherrer Institut**

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J. Stahn and U. Filges

## **The New Beamline for Neutron Optics and other Approaches – BOA**

BOA project is a cooperation of 3 laboratories inside NUM department of PSI:



laboratory head:

M. Kenzelmann

**NOC**

(Neutron Optics and Scientific Computing Group)

U. Filges



Laboratory for  
**N**eutron  
**S**cattering

laboratory head:

Ch. Rüegg

**NIAG**

(Neutron Imaging and Activation Group)

E. Lehmann



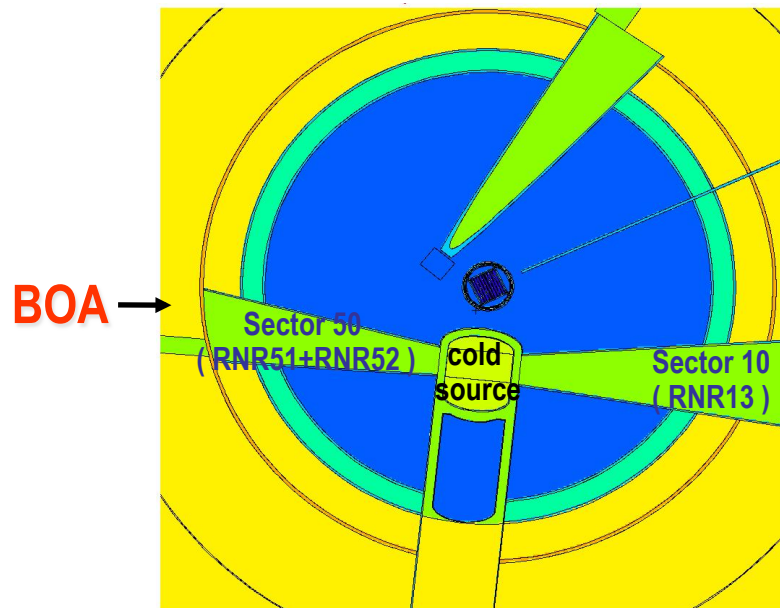
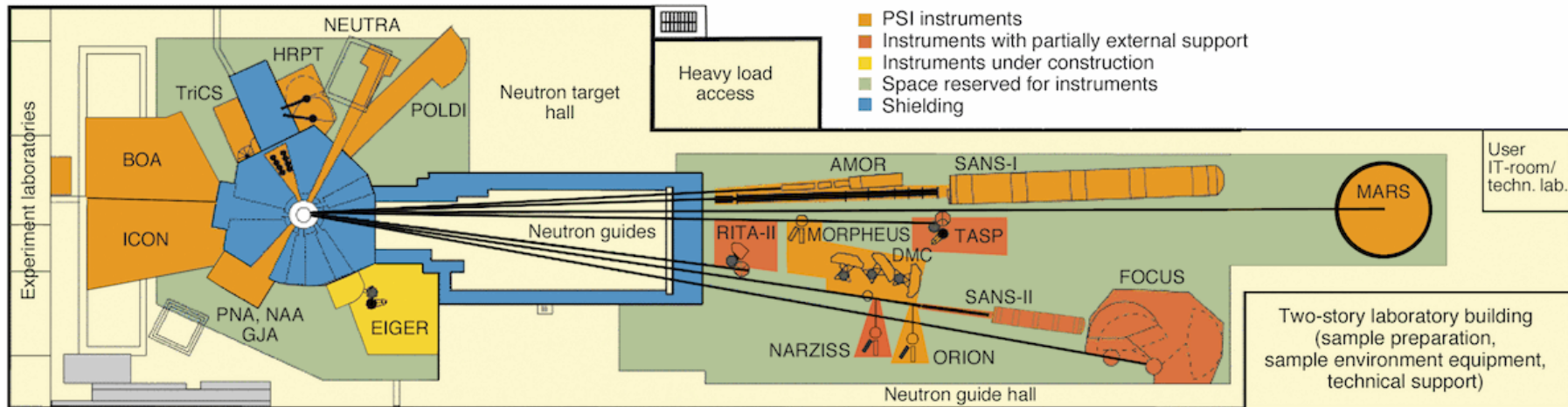
Spallation Neutron Source Division

laboratory head:

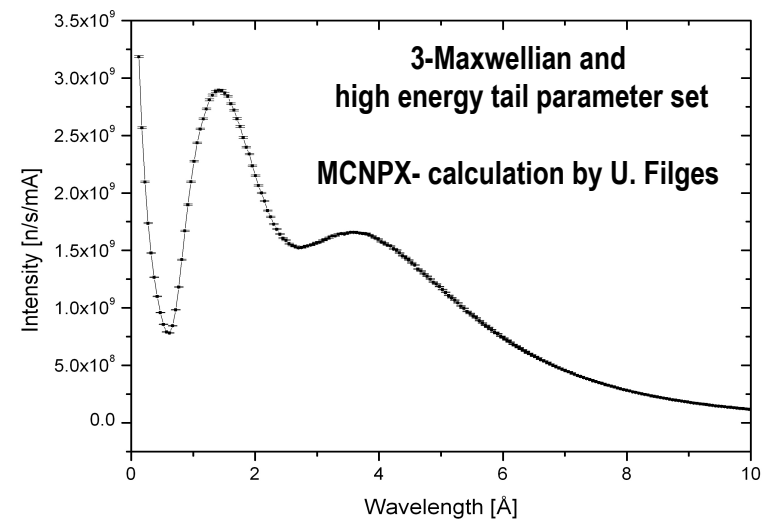
W. Wagner

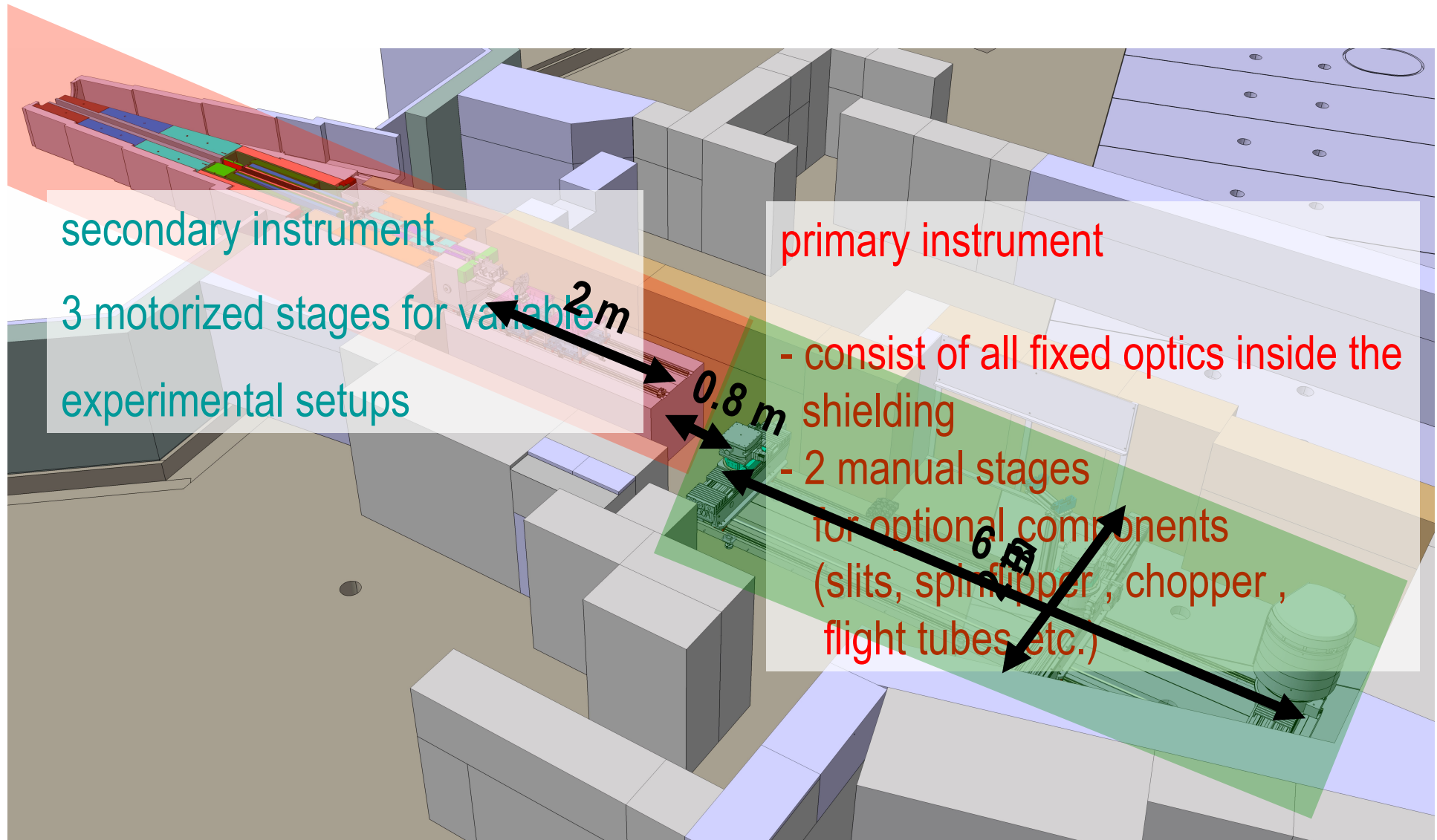
# Beamline location and expected source spectrum

BOA is a redesign of the old FUNSPIN beamline at sector 50



wavelength distribution inside PSI cold source (sector 10 and sector 50)





primary instrument : 2 manual stages (x)

secondary instrument : 3 motorized linear stages at (x and y)

1 rotation stage

3 slit wheels (manual movement): different rectangular slits and pinholes (made of  $^{10}\text{B}$ -Aluminium)

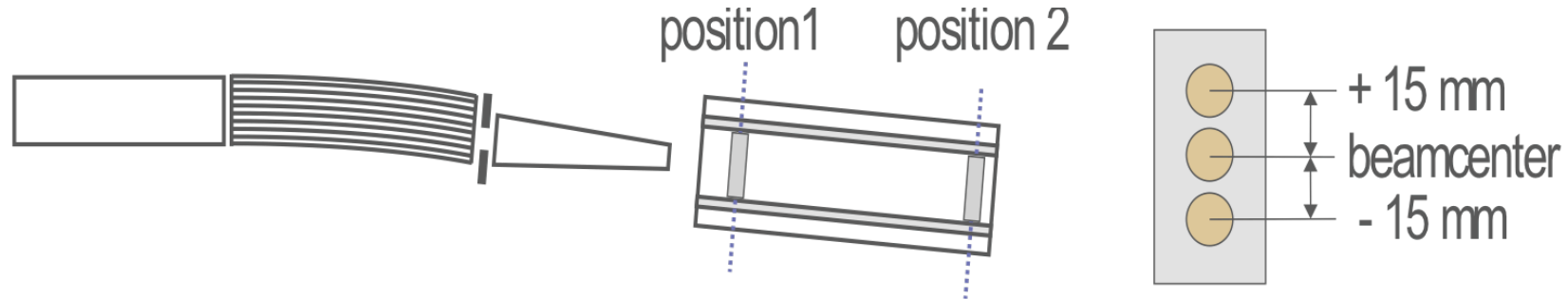
3 fully motorized rectangular slits: cabling not finished yet

1 He3 – counter : final shielding in production

1 CCD-detector system: Andor IKON M with 50mm objective (1024x1024 Pixel)

3 different  $^6\text{LiF}$  scintillator are available (50 , 100 and 200  $\mu\text{m}$ )

beamline control software : SICS (CCD-system was implemented by M. Könnecke)



position 1 :

0.6 m after focusing guide

**shutter slit closed**

$$\varphi_{av,measured} = 4,98 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

$$\varphi_{av,simulated} = 7.0 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

**shutter slit open**

$$\varphi_{av,measured} = 1.11 \cdot 10^8 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

$$\varphi_{av,simulated} = 1.3 \cdot 10^8 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

position 2 :

2.3 m after focusing guide

**shutter slit closed**

$$\varphi_{av,measured} = 1.57 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

$$\varphi_{av,simulated} = 2.90 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

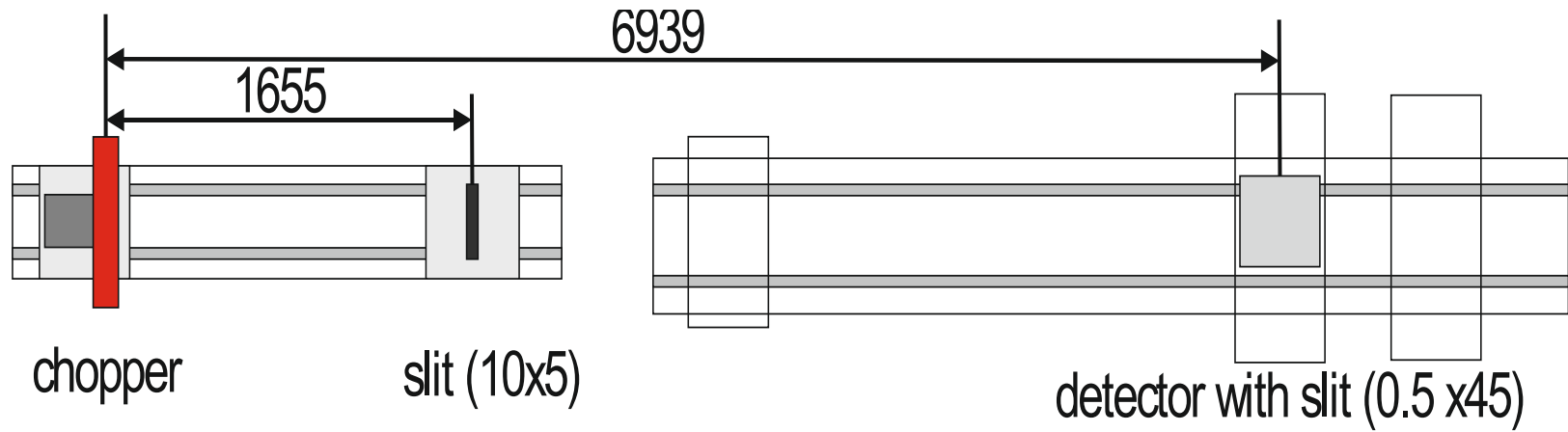
**shutter slit open**

$$\varphi_{av,measured} = 3.73 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

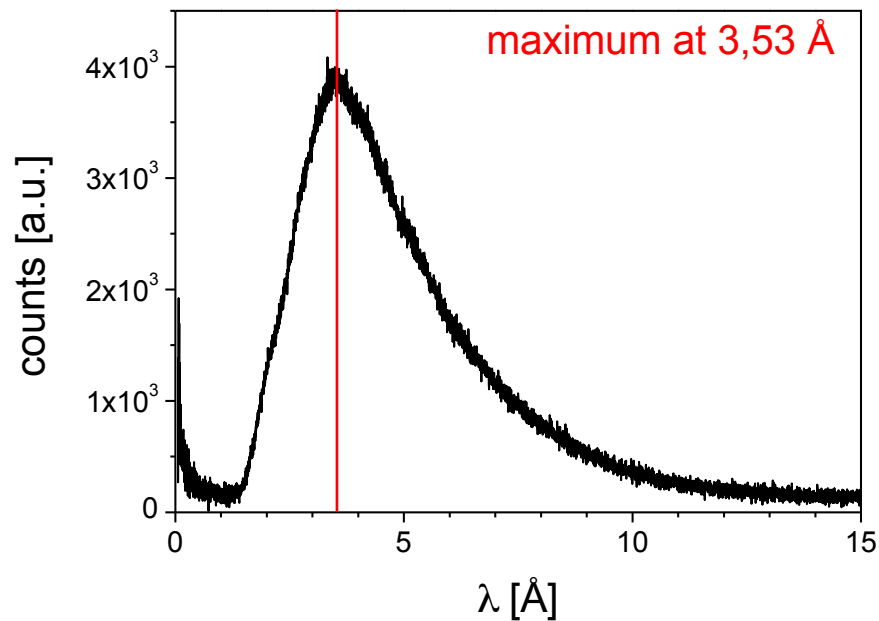
$$\varphi_{av,simulated} = 6.60 \cdot 10^7 \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1} \cdot \text{mA}^{-1}$$

**total flux increase by a factor of ~2.3 using the focusing guide**

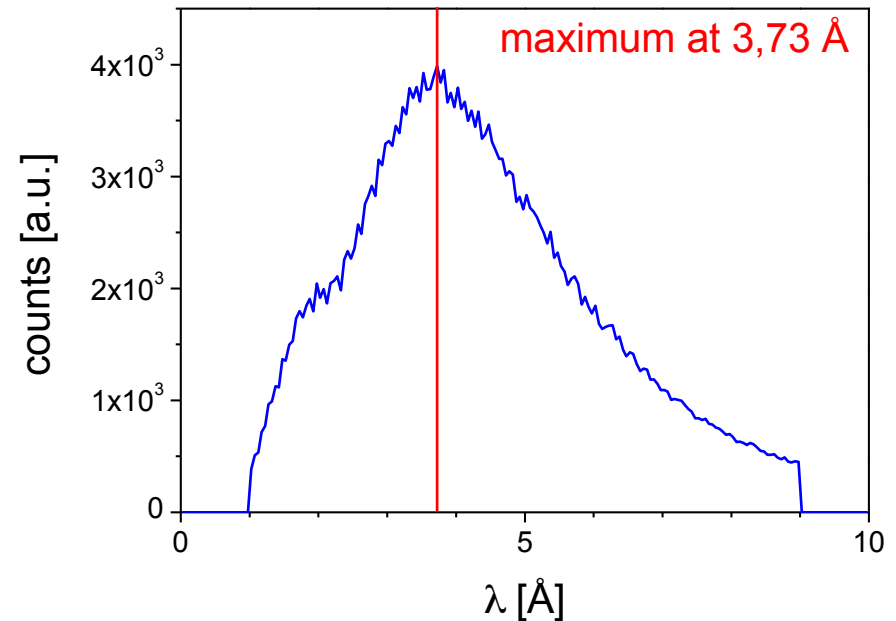
**total flux decrease by a factor of ~1.8 having 1 m longer distance to the source**



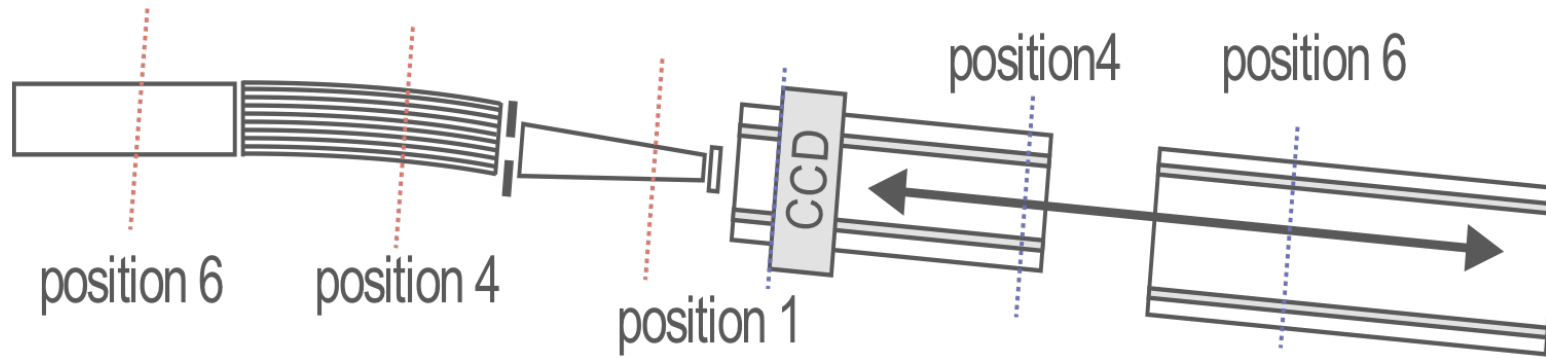
measurement 05.2011



McStas simulation

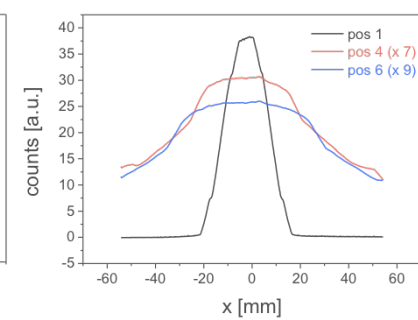
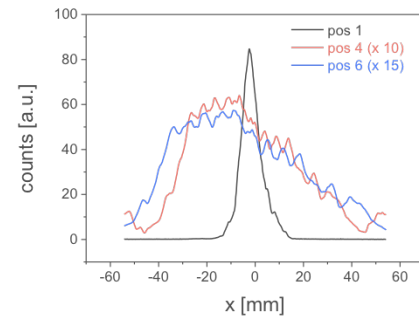
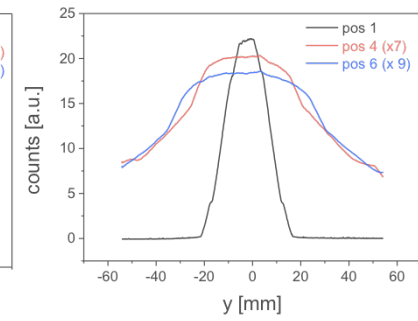
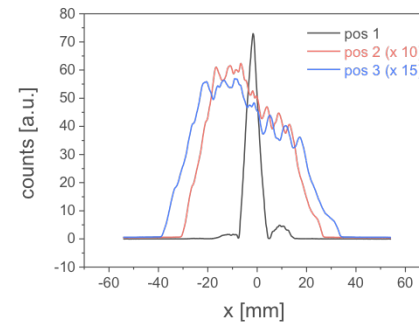
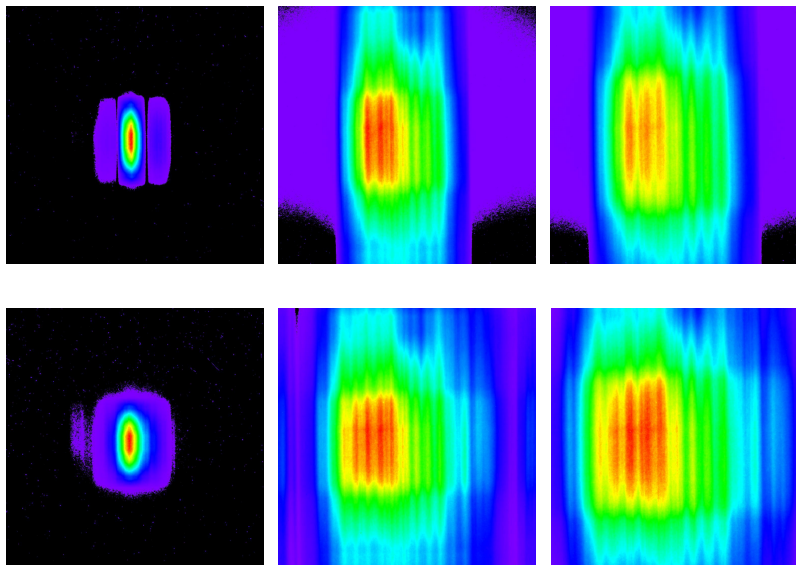


# beam profiles



slit 5mm x 20mm

shutter slit closed  
shutter slit open





# polarisation (results from first experiment at BOA)

experiments performed by M. Haag and P. Hautle

