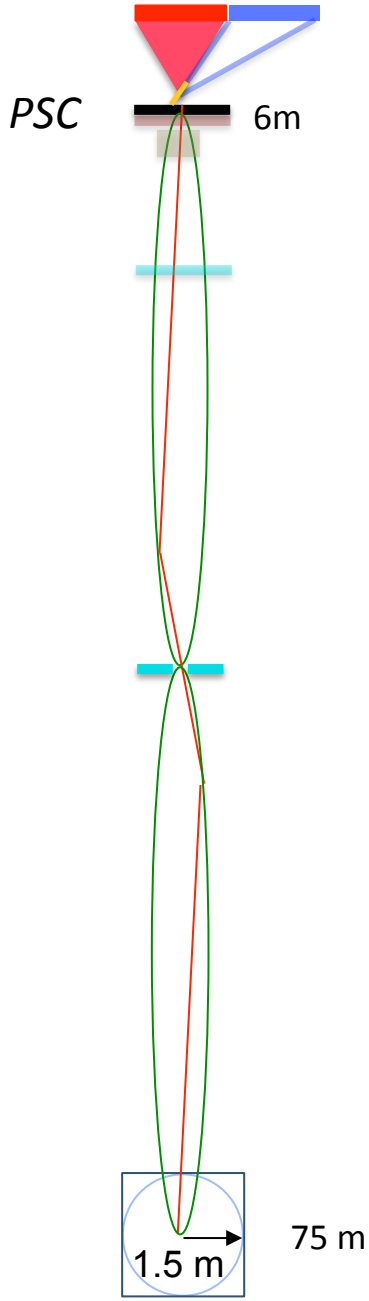


POWHOW bi-spectral powder diffractometer

Werner Schweika, Nicolo Violini, Klaus Lieutenant, Andreas Houben

bi-spectral extraction check ideas

Guide system from Klaus & Leo

extreme environment

Detector *POWTEX* prototypes

Data analysis *POWTEX* (Philipp Jacobs)

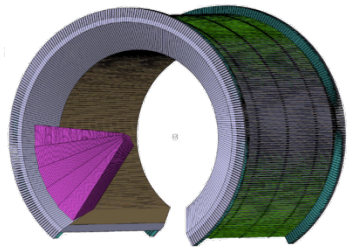
Rietveld refinement in θ and λ

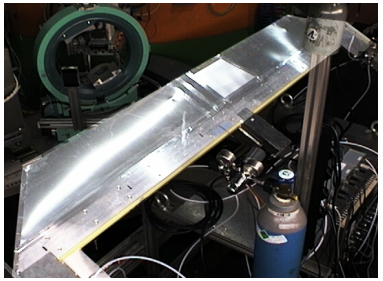
Chopper system

Prototype testing HEiDi / FRM II

B-10 detector

CDT GmbH, Heidelberg

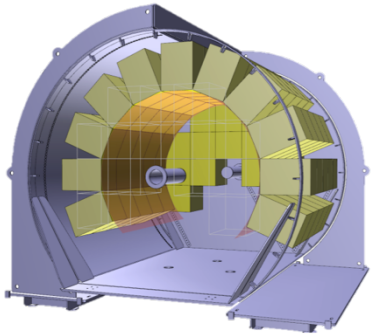


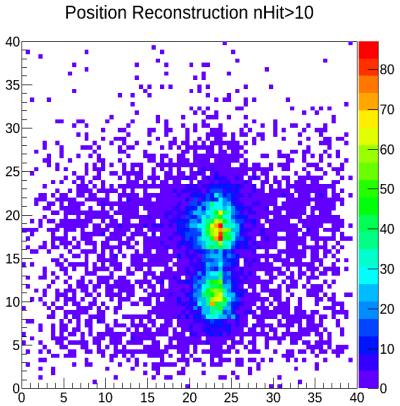


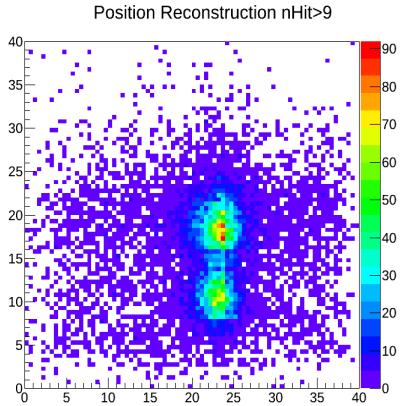
55 % bei 1 Å

WSF

Kemmerling & Engels FZ Jülich







53.6% @ 1.17 Å 57.8%

FWHM 3.5 mm

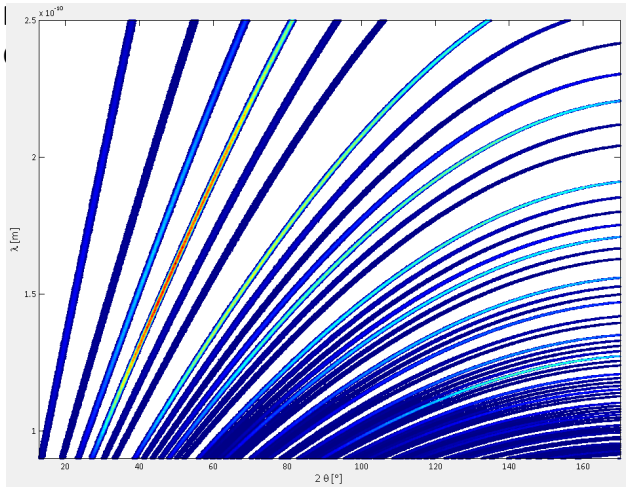
POWTEX

Collaboration with
Philipp Jacobs and Andreas Houben

Software development and Data Analysis (POWdiff)

3-Dimensional Peak Profiling of simulated data using VITESS

- **Peak Shape:** Defined by beam divergence and sample geometry
-
-

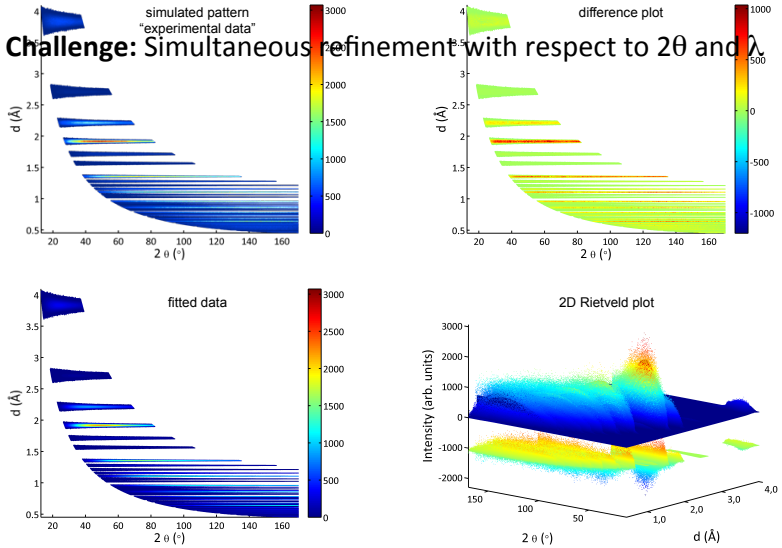


2θ, λ

2θ, d

3-Dimensional Rietveld Refinement

- **Challenge:** Simultaneous refinement with respect to 2θ and λ

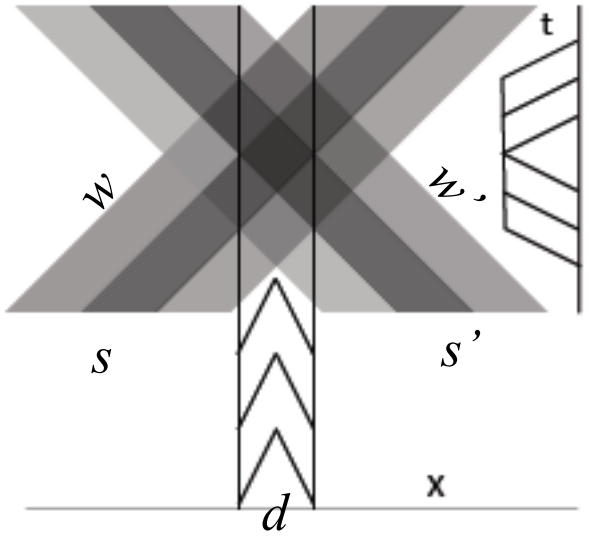


Chopper system

PSC pulse shaping "beat" chopper

a double disk chopper (d=75cm)
counter rotating with different multiples of the 14 Hz source frequency
=>
wave length frame multiplication with
variable time resolution 10 µs to 400 µs

resolution



$$t_{\mathrm{FWHM}} = \frac{ww'}{w+w'}(s+s'-d) = (s+s'-d)\frac{(14\,\mathrm{Hz}\,\pi D)^{-1}}{m+m'},$$

$$w = v^{-1}$$

Chopper system for a thermal powder diffractometer – 150 m

need only PSC : counter rotating discs

$0 < \lambda < 1.9$ Å

fixed

$d_{\text{eff}} = 50\,\text{cm}$

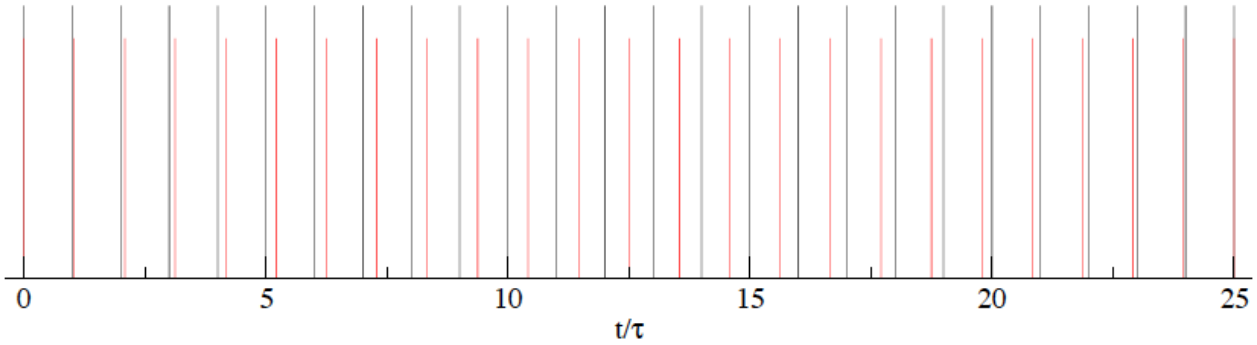
$\nu = 350\,\text{Hz}$

$s = 1.5\,\text{cm}$

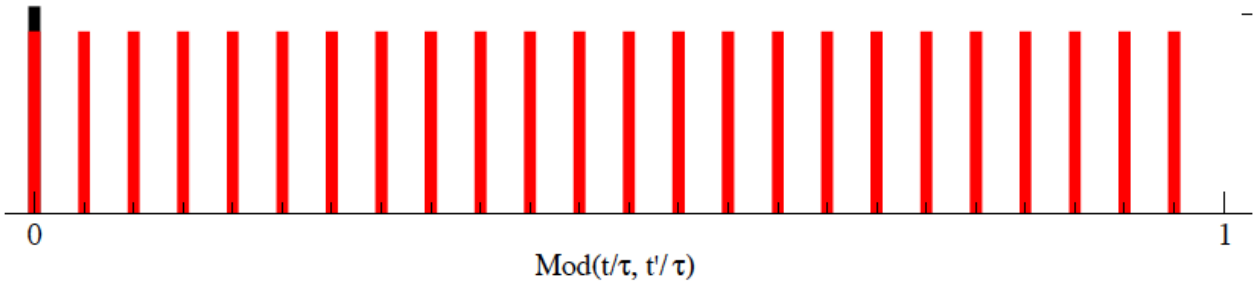
flexible resolution

m'=25 =m+1 m'=m=1

$0.00025 \leq \Delta t/t \leq 0.012$ at 1 λ



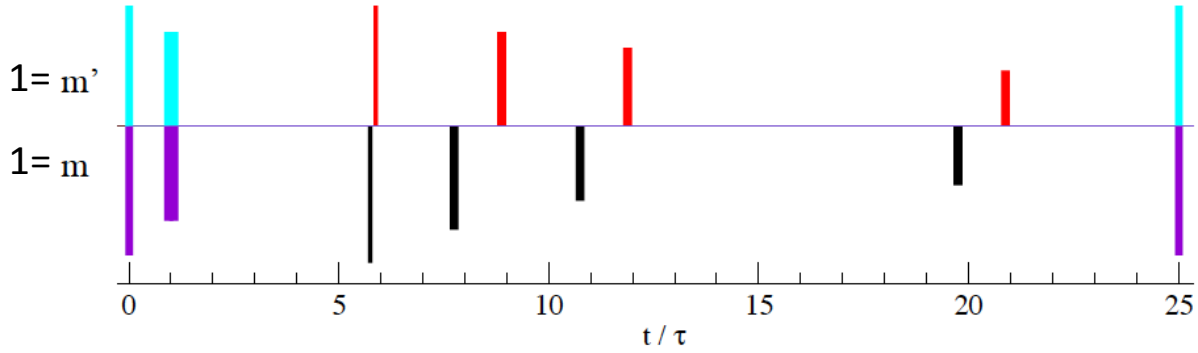
71.4 ms

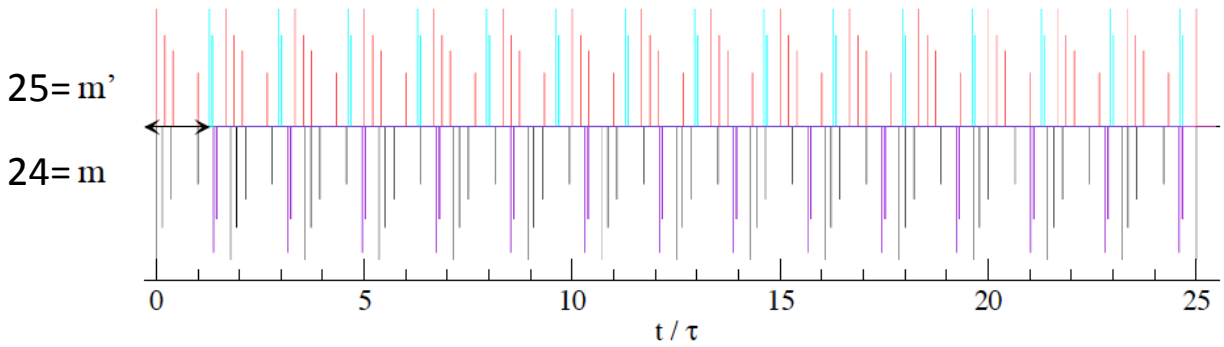


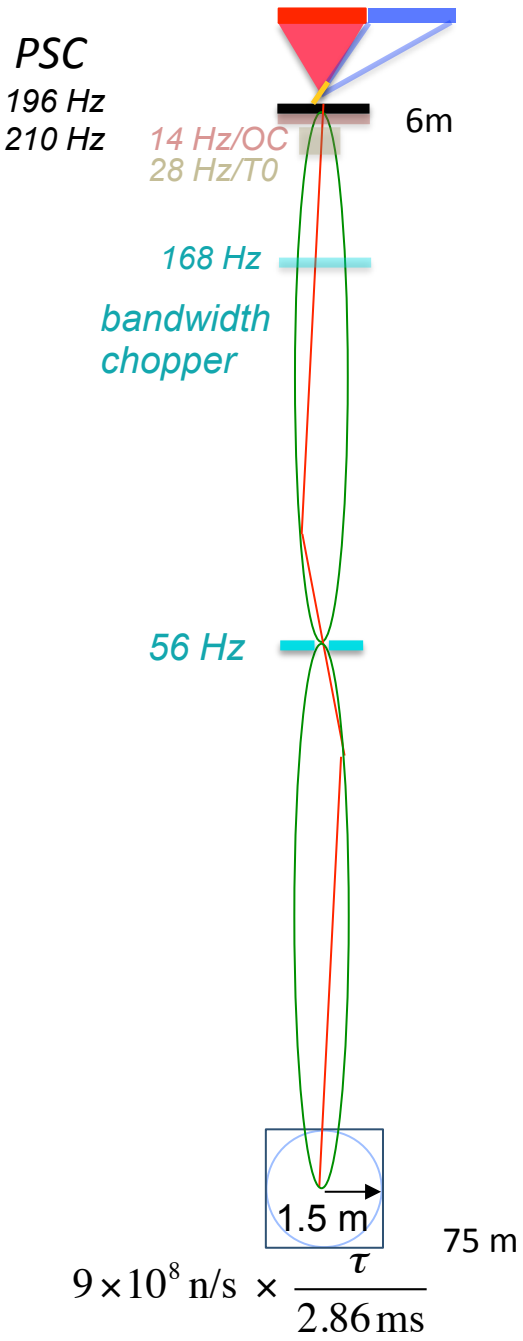
PSC for bi-spectral powder diffractometer

flexibel resolution and 2 subpulses

		λ	λ+1.9 Å
$s_1 = 1\,\text{cm}$ and $s_2 = 2\,\text{cm}$	$m : m'$		
	14 : 15	10.5 μs	31.3 μs
	5 : 6	27.5 μs	82.5 μs
	2 : 3	60.6 μs	181.8 μs
$s_1 = 1.25\,\text{cm}$ and $s_2 = 2.5\,\text{cm}$	$m : m'$		
	1 : 2	151.5 μs	353.5 μs
	1 : 1	227.4 μs	606.3 μs
	0 : 1	378.8 μs	681.8 μs







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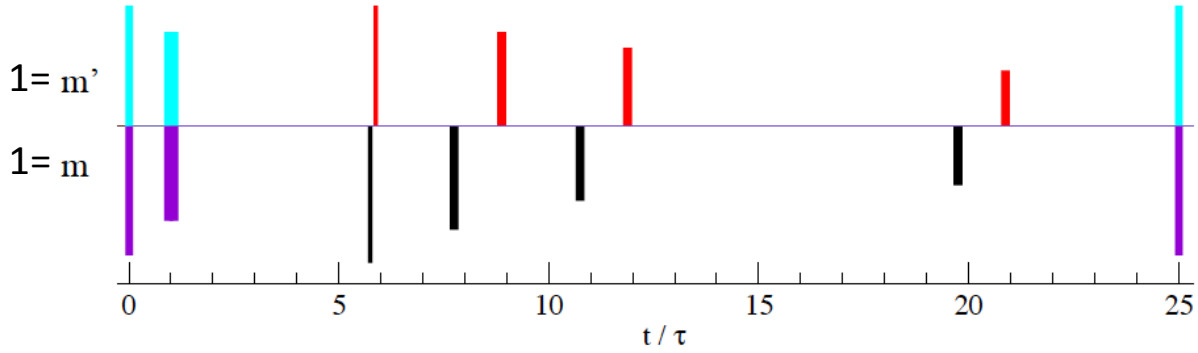

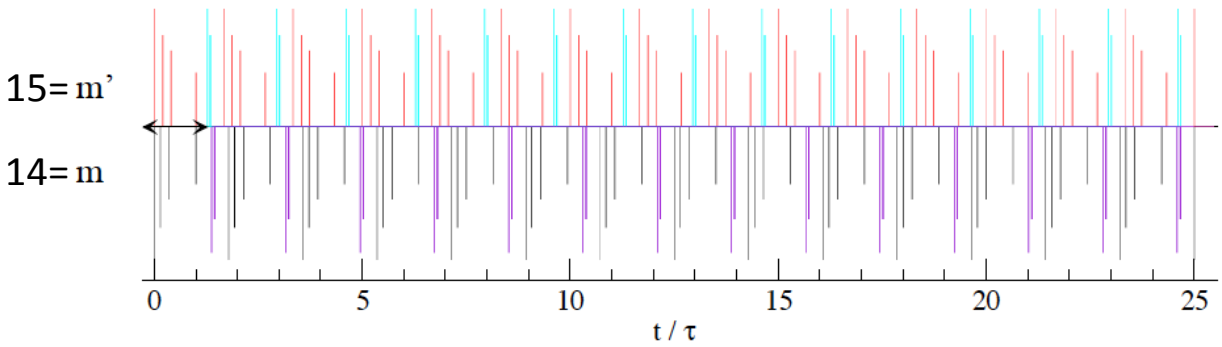

Chopper system

POWHOW bi-spectral powder diffractometer

acceptance diagram