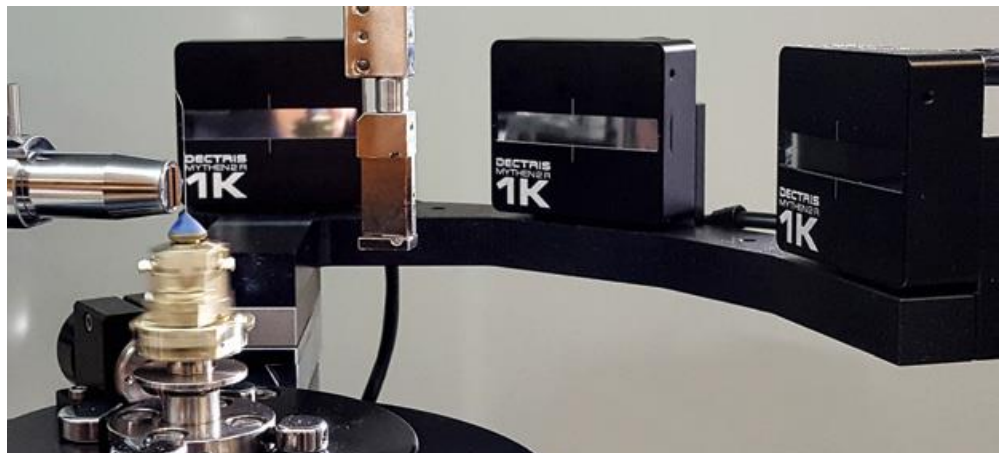


**STOE MULTI-MYTHEN2 R  $n$ K DETECTOR ( $n = 2, 3, 4$ )  
THE SOLUTION IF ONE MYTHEN IS NOT FAST ENOUGH**

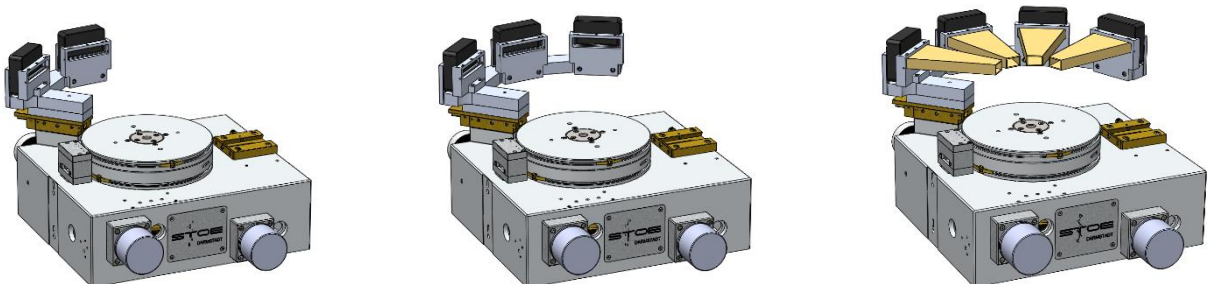


**STOE MULTI-MYTHEN2 R  $n$ K DETECTOR**

Though the combination STOE STADI P diffractometer and DECTRIS MYTHEN 1K detector enables the user to collect high resolution powder data over a large 2Theta region in very short time, some experiments, especially in the wide field of non-ambient methods, require the possibility to take “snapshot patterns”.

In combination with their MYTHEN2, DECTRIS launched the DCS4 which offers the possibility to process the data of up to four MYHTEN2 modules simultaneously. Consequently the installation of two, three or four MYTHEN2 R modules on one detector arm for the STOE STADI P has been obvious and the result is the STOE MULTI-MYTHEN2 R  $n$ K ( $n = 2, 3$  or 4).

In combination with STOE’s high temperature attachments or with an Oxford Cryostream, the STOE MULTI-MYTHEN 2 R  $n$ K offers the user the optimized detector for temperature depending measurements. Highly time resolved observations as in battery cells are possible as well as data collection for PDF calculations in a reasonable time scale. The STOE MULTI-MYTHEN 2R  $n$ K is available with all actual chip thicknesses (320, 450 or 1000 $\mu$ m).



Left to right: MYTHEN2 R 2K, MYTHEN 2 R 3K and, ideal for PDF-data collection, MYTHEN2 R 4K

# STOE MULTI-MYTHEN2 R $n$ K DETECTOR ( $n = 2, 3, 4$ ) THE SOLUTION IF ONE MYTHEN IS NOT FAST ENOUGH

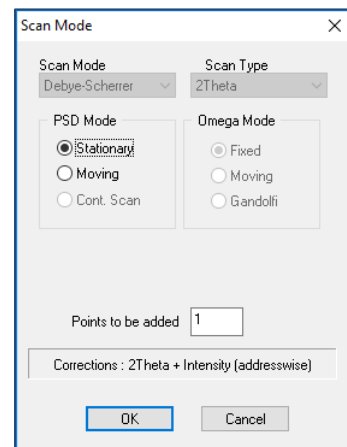
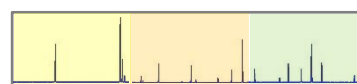
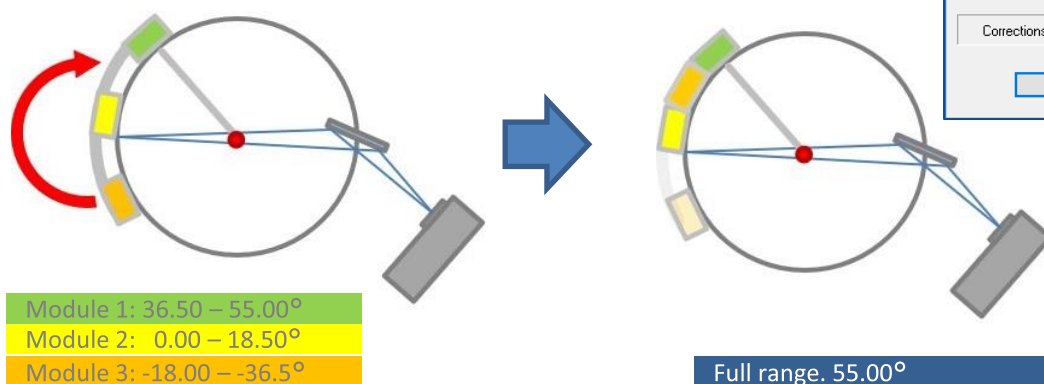
Linked with the arrangement of more than one MYTHEN2 R module on a detector arm is the question how to treat the resulting gaps. To cover the full 2Theta range of a STOE STADI P with a modicum of modules, the MULTI-MYTHEN2  $n$ K has gaps only a little smaller than the width of the detector window (approximately 18.5 degrees 2Theta) and offers two different measurement strategies:

- A **stationary mode**, in which the multi-detector is sited in a position with at least one module below the zero point and the data from the negative 2Theta range is folded by the WINXPOW software into the gap(s) of the pattern measured in the positive 2Theta range.
- A **moving mode**, in which the multi-detector is sited at two different 2Theta positions and the modules are exposed twice to the diffracted beam for the same measuring time. After the data collection, both patterns are combined to one pattern without gaps.

Following both modes are explained for the MULTI-MYTHEN2 R 3K:

## MYTHEN2 3K – STATIONARY MODE

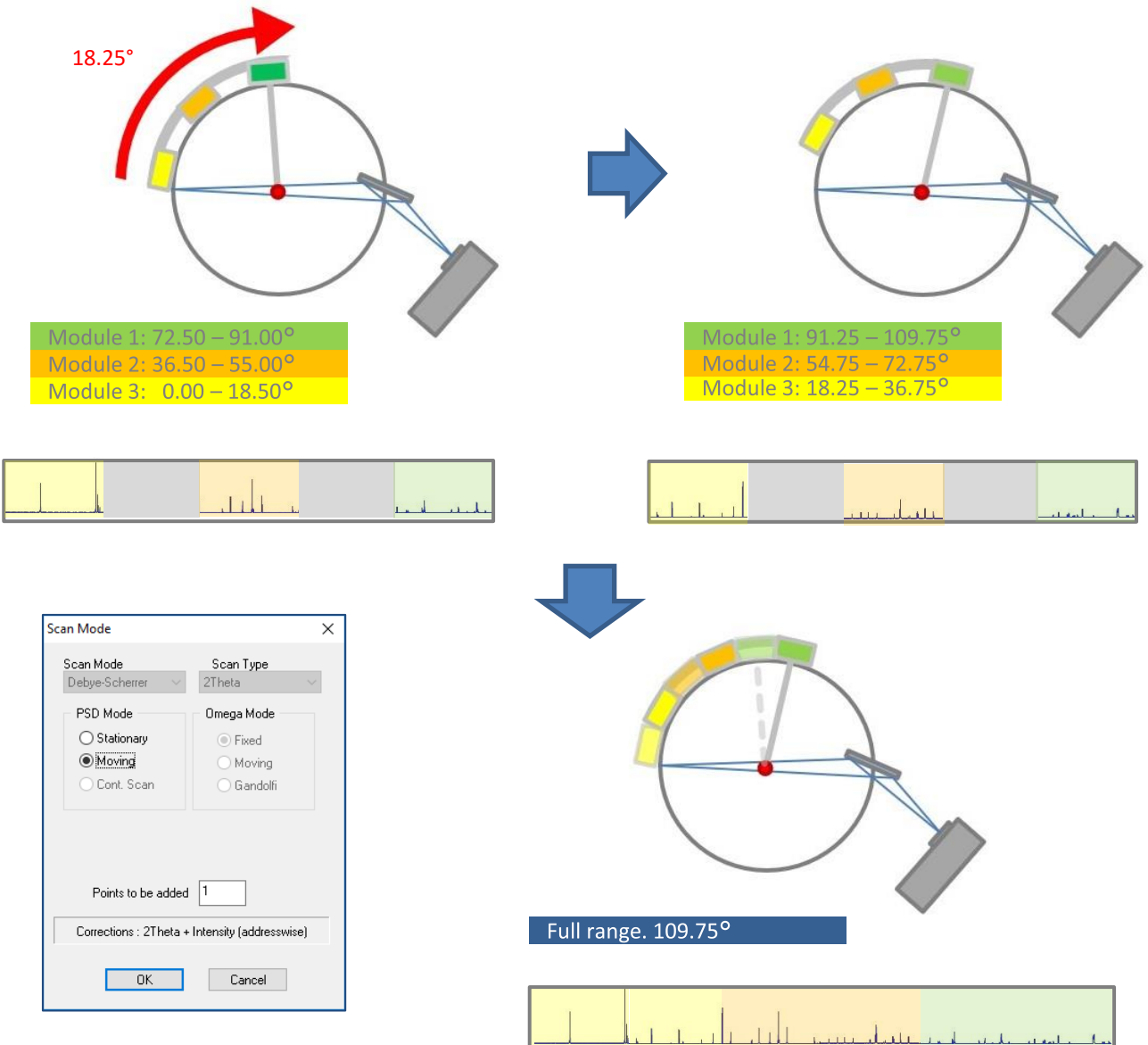
In the stationary mode, the 3K doesn't move but takes one pattern with two gaps. After the shutter closed, the pattern taken with the low angle module is folded by the software in the gap between the two modules yielding a pattern of 55° 2Theta.



# STOE MULTI-MYTHEN2 R $n$ K DETECTOR ( $n = 2, 3, 4$ ) THE SOLUTION IF ONE MYTHEN IS NOT FAST ENOUGH

## MYTHEN2 3K – MOVING MODE

Collecting data in the moving mode, the 3K takes one pattern (with 2 gaps), then the shutter closes and the detector arm makes an  $18.25^\circ$ -step. The shutter opens again and the 3K takes a 2nd pattern (again 2 gaps). These 2 patterns are combined by the software to one pattern (with no gaps) of  $109.75^\circ$ .

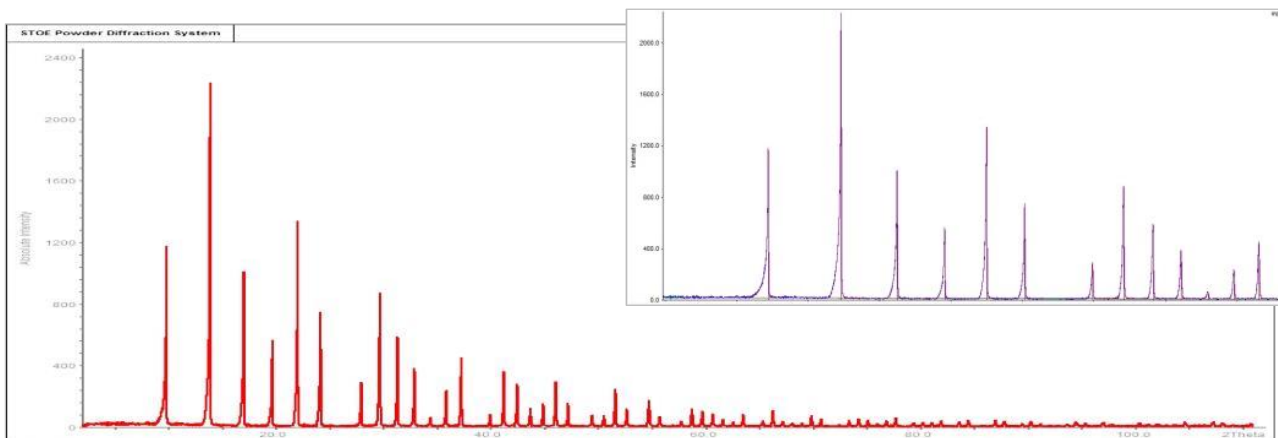


## STOE MULTI-MYTHEN2 R $n$ K DETECTOR ( $n = 2, 3, 4$ ) THE SOLUTION IF ONE MYTHEN IS NOT FAST ENOUGH

### ULTRA FAST MEASUREMENTS WITH EXCELLENT DATA QUALITY

To prove the data quality of a pattern measured in the moving mode, particularly with regard to the 2Theta range close to the joints of the single module patterns, a glass capillary of 0.5mm diameter was filled with NIST 660b LaB<sub>6</sub> standard material and mounted on a STOE STADI P in Debye-Scherrer geometry using a STOE MULTI MYTHEN2 R 3K detector (450µm chip thickness) and Mo K $\alpha$ 1 radiation.

The sample was measured from 2 to 110° 2Theta in 120 s (2x60s, moving mode) and the data taken to refine the cell. The first 40° 2Theta of the fit are magnified in the upper right corner of the figure. The impressive results of the refinement are listed in the table below.



File title: LaB6  
Wavelength: 0.709300  
Number of accepted peaks: 68  
2Theta window: 0.050  
2Theta zeropoint: 0.0023 (refineable)  
Symmetry: Cubic P  
Spacegroup: P m-3m (No. 221)  
Initial cell parameters: Cell\_A: 4.1569

Refined cell parameters :  
Cell\_A: 4.15698(11)  
Cell\_Volume: 71.834(3)  
Number of single indexed lines: 68  
Number of unindexed lines: 0  
2Theta zeropoint: 0.0014(23)  
Average delta(2Theta) = 0.005  
Figure of Merit F(30) = 460.4 ( 0.002, 31 )