Introduction

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DE-K2

- In-Kind, Design Update Phase
- Jan 2011 – Dec 2013
- Gd-MSGC was WU4 of WP K2

Deliverable /Milestone	Description	% completion	comments
D.K.2.4.1	Characterization of the MSGC (including converter) with simplified read-out electronics, report (HZB, TUM)	100	
D.K.2.4.2	Size-dependent cost estimate; report (HZB)	100	
D.K.2.4.3	Validation of the front-end electronics and redesign, if required (ASIC, FPGA) (HZB, JÜLICH)	100	
D.K.2.4.4	Analysis of non-flammable counting gases and design of a compact gas handling system (HZB, TUM)	50	No manpower
D.K.2.4.5	Prototype with test results and design; report (HZB)	100	
D.K.2.4.6	Study of the long-term stability and ageing effects; report (HZB)	0	No manpower
M.K.2.4.1	Detector principle demonstrated successfully with quantification of detection probability.	100	

NMX

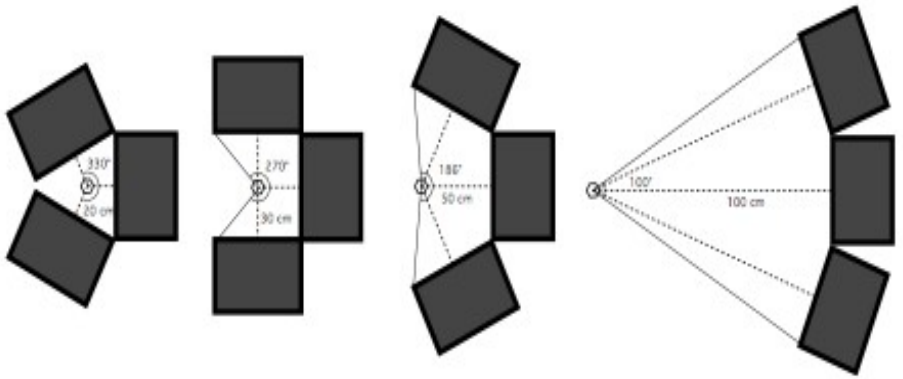

Figure 4 The detector geometry illustrated as a function of crystal-detector distance and the total scattering angle covered in the horizontal plane.

Detector technology

In terms of technologies to match the required performance, the preferred option is Micro-strip gas chamber (MSGC) detectors coated with gadolinium. They would offer a high position and timing resolution combined with a high detection efficiency in this wavelength range. These are being actively developed for example by Helmholz Zentrum Berlin as part of the ESS in-kind contributions (WU-1.4.2.7.2.2/SD010DE). The present state of the research and development (R+D) is such that the requirements can be matched by this detector technology, however detailed testing of prototypes is needed, in particular relating to operational usage and longevity. The cost and production capacity for such a detector also needs to be evaluated in detail.

- 0.2mm Resolution
- 60x60cm modules?

- As NMX is 1 of the 3 instruments so far, we have had to prioritise this
- Hence ESS joined RD51
- Collaborating with CERN on GEMs
- Doro + Filippo at CERN

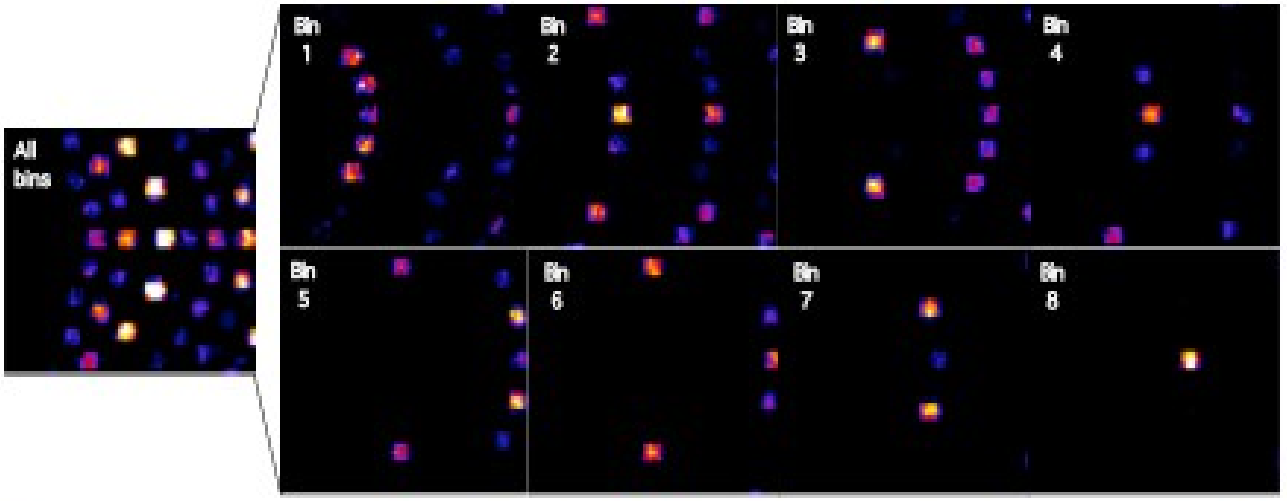

Figure 5 A crowded part of a simulated diffraction pattern from a 5 mm crystal of perdeuterated rubredoxin at detector distance of 20 cm and 2θ-angle of 45° split into nine time bins. Bin 9 contains no reflections and is hence not shown.