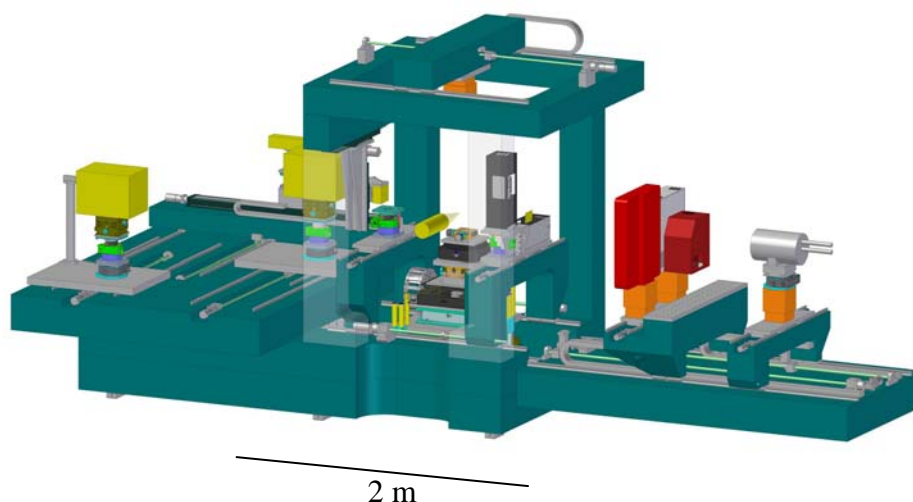


Grain mapping instrument in EH4

The “mapper” instrument is currently being built in-house by GKSS for grain tracking type experiments. Applications include 3D x-ray microscopy, diffraction contrast tomography, high angular resolution 3D-XRD, and topo-tomography. The instrument is designed to handle large or heavy sample environments with high accuracy, and to allow different optics and detectors to be easily interchanged. It consists of a combined sample and optics table, and a separate detector table. Both tables are constructed from granite for mechanical stability. Detectors and optics can be positioned at different distances from the sample depending on requirements.



Specifications

Sample mass:	up to 20 kg
Sample rotation:	<i>Aerotech ABRS 300</i> errors < 500 nm (< 250 nm for 5 kg load) asynchronous errors <60 nm and <30 nm respectively
Rotation axis lateral translation:	<i>Aerotech ABL 8000</i> repeatability < 0.3 μm maximum 150 mm between top of sample stage and beam height.
Beam size at sample position:	0.9 mm (v) x 2 mm (h) for high- β mode 0.9 mm (v) x 6 mm (h) for low- β mode

Additional equipment

CR lenses (*Karlsruher Institut für Technologie*) for line (1d) focusing to $\sim 1 \mu\text{m}$ FWHM
PI M-824 hexapod for positioning the CRLs

Long range microscope for alignment / observation of samples (resolution $\sim 7 \mu\text{m}$)

Risø 3D detector: Simultaneous images at two working distances (d, d+10 mm)
and two pixel sizes (1.5 μm , 4.5 μm)
Both images 2000 x 2000 pixels
can be used simultaneously with a third far field detector

Photonic Science VHR detector: 31 μm pixel size, 4008 x 2672 pixels

The instrument can also use the *MAR 345 image plate* detector, or the *MAR 555 direct conversion Se detector*

Reference King *et al.*, *Materials Science Forum* **652** (2010) 70-73