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Vacuum-compatible hybrid photon counting pixel detector for WAXS, XRD and XRR in the tender X-ray range

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Abstract

A vacuum-compatible hybrid pixel detector has been installed in the UHV reflectometer of the four-crystal monochromator beamline of the Physikalisch-Technische Bundesanstalt (PTB) [1] at the electron storage ring BESSY II in Berlin, Germany. It was developed in cooperation with Dectris and is based on the PILATUS3 100k module. The detector can be used in the entire photon range of the beamline from 10 keV down to 1.75 keV. In comparison to the PILATUS 1M detector used for small-angle scattering (SAXS) and grazing incidence SAXS (GISAXS) [2] it is possible to access larger scattering angles. The water-cooled module can be positioned from -55° to $+55^\circ$ with respect to the incoming beam at a distance of about 200 mm from the sample. The quantum efficiency, homogeneity and linearity of the new detector have been investigated. First results of the performance in wide-angle X-ray scattering (WAXS), X-ray diffraction (XRD) and X-ray reflectometry (XRR) will be presented.

References

- [1] M. Krumrey and G. Ulm, *Nucl. Instr. and Meth. A* **467-468**, 1175 (2001)
- [2] J. Wernecke, C. Gollwitzer, P. Müller and M. Krumrey, *J. Synchrotron Rad.* **21**, 529 (2014)

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