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Area detector prototype for the hot single crystal diffractometer HEiDi

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The HEiDi single crystal diffractometer at the hot source of the MLZ's FRM II offers high thermal and hot flow, high resolution and a large Q range. These properties make it an excellent tool to obtain detailed structural information for a wide range of current scientific topics.
Within the framework of two recent projects funded by the BMBF, great efforts have been made to expand the capabilities of the instrument. These include optimized neutron optics for short wavelengths (e.g. λ = 0.87 Å) to maximize the flux and signal-to-noise ratio for studies on small samples « 1 mm³. as well as diamond anvil and clamp cells for high-pressure experiments up to the GPa range and down to low temperatures [e.g. A. Grzechnik et al. J. Appl. Cryst. 53(1), 1-6 (2020)].
In addition, a position-sensitive 2D detector (PSD) is under development in cooperation with the JCNS of the FZJ. The PSD prototype is based on 6Li glass for neutron-photon conversion and fifteen position sensitive multi-anode photomultiplier tubes (MaPT) with a sensitive area of 48 x 48 mm³ and 16 x 16 pixel each. The design offers high sensitivity at short wavelengths (~70% at 0.9 Å) and a sensitive area of 23° x 13° (width x height). This ensures the detection of weak signals and (e.g. incommensurate or magnetic) superstructure reflections as well as a faster and more efficient sample characterization and data collection. Further details of the PSD concept as well as other planned extensions will be presented in the conference contribution.

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