

## The Maia Detector at Petra III P06

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The P06 microprobe-endstation is dedicated to Scanning X-ray fluorescence imaging and spectroscopy. Kirkpatrick–Baez mirrors are used to focus the X-ray beam down to the 300nm level in the energy range 5 - 23 keV. The high flux ( $10^{10}$  -  $10^{12}$  photons/s) in the microfocus allows fast scanning routines but this also calls for detectors that can handle high data rates and short acquisition times with appropriate energy resolution. In a collaboration between CSIRO (Australia), and BNL (USA) the *Maia* detector was developed, which is optimized for such conditions. *Maia* provides fast acquisition of full spectra by acquiring data photon-by-photon in streaming mode. Using a novel analysis method, *Dynamic Analysis*, elemental maps develop in real time during on-the-fly scanning.

The detector consists of 384 individual photo diodes, arranged in an annular backscattering geometry. The current version provides an energy resolution of 255 eV (5.9keV) (mean) and operates in the energy range 1.5 - 40keV. In combination with streamlined data handling using an internal FPGA (Field Programmable Gate Array), count-rates exceeding  $10^7$  photons/s and pixel transit times as small as 50  $\mu$ s can be achieved [1,2]. Since June 2013 the *Maia* detector is installed at the microprobe endstation of P06 and available for user experiments.

### References

[1] C.G. Ryan, et al., Nucl. Instrum. Methods Phys. Res., Sect. A, 619, 37 (2010).

[2] C.G. Ryan, et al., J. Phys.: Conf. Ser. 499 012002 (2014).