

# The Microspectroscopy Beamline at the Australian Synchrotron: design and capabilities.

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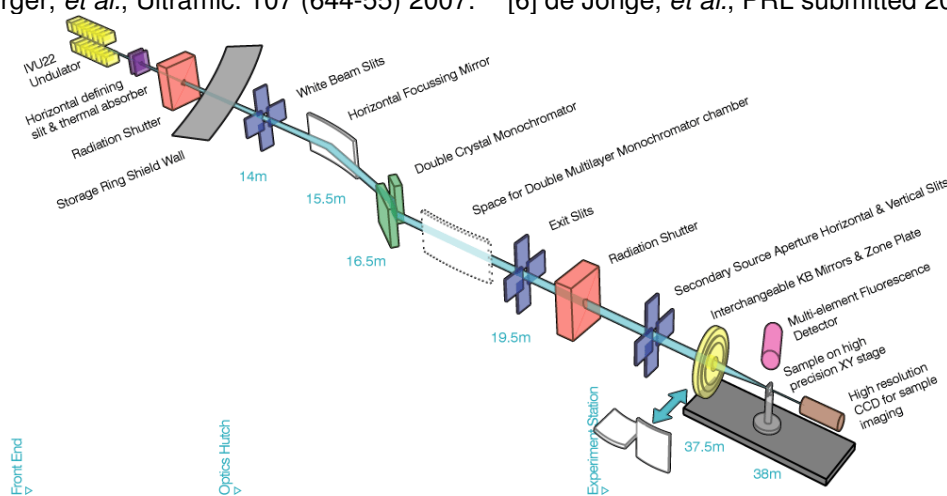
## Abstract:

A hard x-ray micro-nanoprobe is being constructed at the Australian Synchrotron [1] to provide sub-micron spatial resolution across an energy range of 4.5–25 keV. The SXM will combine 2D mapping with  $\mu$ -XRF,  $\mu$ -XANES and  $\mu$ -XAFS for elemental and chemical microanalysis. The primary design goal is to achieve sub-100 nm spatial resolution with  $\Delta E/E \sim 10^{-4}$ , and sub-ppm elemental sensitivity. The optical design is a novel “all horizontal” scheme [2]. Interchangeable Fresnel zone plates and Kirkpatrick-Baez mirrors will be used. An advanced fluorescence detector developed by BNL [3] and CSIRO [4] featuring a large solid-angle planar silicon array will enable count rates up to  $10^8$  events/sec and real-time processing with deconvoluted image projection. A differential phase contrast detection scheme [5] will be employed for quantitative measurement of soft matter [6].

The Microspectroscopy Beamline will commence operation in late 2008 and will accommodate a diverse range of environmental, biological and materials science applications to cater for the broad requirements of the Australian community. The design, anticipated performance and research applications will be discussed.

## References:

- [1] Paterson, *et al.*, AIP Conf. Proc 879 (864-7) 2007. [2] Lai, *et al.*, AIP Conf. Proc 879 (1313-6) 2007. [3] Siddons, *et al.*, AIP Conf. Proc 705 (953) 2004. [4] Ryan, *et al.*, NIM B 260 (1-7) 2007. [5] Hornberger, *et al.*, Ultramic. 107 (644-55) 2007. [6] de Jonge, *et al.*, PRL submitted 2007.



**Figure:** Conceptual layout of the Microspectroscopy Beamline see [www.synchrotron.org.au](http://www.synchrotron.org.au)