

The High Resolution Powder Diffraction Beamline for the Australian Synchrotron

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The powder diffraction beamline at the Australian Synchrotron will be located on a bending magnet source and will comprise two end stations. The beamline is optimised for operation over the energy range 5 to 30 keV. The main optical elements of the photon delivery system, which are to be supplied as a turnkey package, are: a vertical collimating mirror with variable incidence angle for optimal harmonic rejection; followed by a double crystal monochromator with sagittal focusing capability; and finally a vertical focusing mirror.

This beamline will be suited to range of experimental techniques, including Multiple-wavelength Anomalous Dispersion (MAD), *ab initio* structure solution, Pair Distribution Function (PDF) analysis, parametric temperature studies, and high pressure experimentation using a diamond anvil cell. The first experimental station will be devoted to investigations using high resolution diffraction from polycrystalline materials including: pharmaceuticals; solid metal oxides; microporous materials; and minerals and minerals processing. The second end station will be a multipurpose instrument with an emphasis on mechanical engineering applications, namely mapping of strain, phase and texture.

The beamline design and performance calculations are presented.