The New MRCAT (Sector 10) Bending Magnet Beamline at the Advanced Photon Source

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Abstract. The Materials Research Collaborative Access Team (MRCAT) has completed construction of its bending magnet beamline at the Advanced Photon Source, with commissioning ongoing since October 2008. Full operations including General User access will begin in January 2010. The beamline is designed to operate in two distinct modes: pink beam for lithography, photochemistry and tomography; and monochromatic beam for x-ray absorption spectroscopy and tomography. Pink beam is obtained by means of a 880 mm water cooled Pt mirror combined with filters, while monochromatic beam is selected using a water-cooled double-crystal Si(111) monochromator, providing an energy range from below 4 keV to greater than 33 keV. Switching between modes is accomplished in under one hour.

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INTRODUCTION

The Materials Research Collaborative Access Team (MRCAT) bending magnet beamline, 10BM, at Argonne's Advanced Photon Source (APS) was brought on line in 2004 for white and pink beam operations, primarily for X-ray lithography. In 2007 10BM was taken off line for a thorough reconfiguration to split the existing hutch into separate white and monochromatic hutches and to add X-ray absorption spectroscopy capabilities in a downstream "B" hutch. The new configuration for 10BM will complement the capabilities of 10ID[1] by making it possible to offload experiments that are not severely flux or brightness limited to this companion beamline. The redesign has also enhanced the white and pink beam operations in the "A" hutch with the addition of precision slits and the possibility of better beam characterization using the monochromatic beam. Commissioning experiments have been ongoing since October 2008 and the full General User program will begin in the first run of 2010.

The membership of the MRCAT[2] has evolved over its first fifteen years and as a consequence the scientific emphasis has evolved as well. Although a strong materials emphasis still exists, research with an environmental focus is now on relatively equal footing. An important subset of materials research is catalysis. Therefore, hazardous gas handling infrastructure (storage and ventilation) is available for all user-accessible hutches, sector wide.