

B31

New compact double crystal monochromator

Fred Middleton, Grant Emmel, and Farshid Feyzi

Physical Sciences Laboratory, University of Wisconsin-Madison, 3725 Schneider Drive, Stoughton, WI 53589

The UW-PSL has proposed a unique double crystal monochromator to the Advanced Photon Source and UNI-CAT that has resulted in two development contracts for the instrument. Two very similar designs have been made that are capable of accepting inclined geometry, other high heat load optics, and sagittal focusing crystals by provision of ample space for such optical elements.

The monochromator is a compact instrument with a single rotational stage that does not require a track system for gaining access to the crystals, yet fits in the confined back space at APS by having only 300 mm distance between the beam centerline and back of the instrument. The frame footprint is only 0.74 m x 0.84 m.

The instrument is truly UHV rated for vacuum in the $1.0\text{E-}10$ torr range by virtue of unique internal mechanisms for linear positioning and rotational adjustment of crystals. The design can be modified for operation at low energy synchrotron radiation in the 0.8 to 4.0 keV range requiring higher Bragg angles.