

## Sagittal Focusing of High-Energy x-rays By Sagittally Bent Laue Crystals: Design and Performance at NSLS X7B Beamline

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### Abstract

The idea of sagittal focusing using Laue crystals was developed at the NSLS a few years ago. The extent of such focusing is similar to that of sagittal focusing by a Bragg crystal, except for a factor related to the asymmetry angle. The anticlastic bending facilitates the use of inverse-Cauchois geometry in the meridional plane to provide better energy-resolution and to increase the photon flux by an order-of-magnitude compared to traditional sagittal focusing with Bragg crystals. Furthermore, sagittal focussing by a Laue crystal is preferred over a Bragg crystal at x-ray energies above 30 keV because, unlike Bragg crystals, the length of the beam's footprint on a Laue crystal is small and insensitive to energy. Recent developments include a modified Boomerang design to make the two-bounce version easily tunable. Specific utilization of these concepts at X7B beamline is discussed. Challenges include crystal bending methods that minimize twist, correction for the inevitable twist, and cooling issues.

### References:

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