Technology Development and Commercialization Division

Hard X-Ray Quad Collimator Facilitates Microcrystallography Experiments

Flexible Incident X-Ray Beam Reduction in a Rugged, Compact, Affordable Package

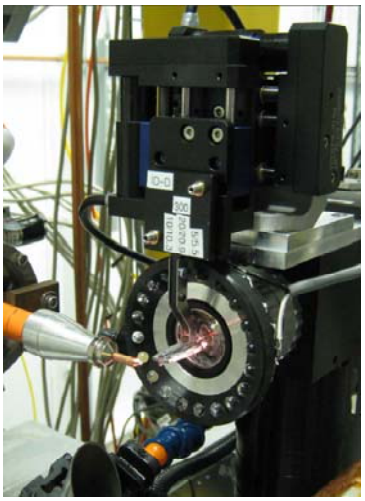
One of the best ways to obtain small-size x-ray beams for structural biology research is to use aperture-defined collimating devices. Individual collimating apertures of the order of 5 to 100 micrometers have been in use for about a decade, and they are still in use at x-ray facilities around the world, including synchrotrons. Manual aperture switching, while still performed at many facilities, is a time-consuming process.

Argonne's new Quad Collimator System is an economical, compact, highly precise multi-collimator system used to reduce the size of an incident x-ray beam to that of the sample or smaller. Apertures are customizable, depending on the application.

The Quad Collimator is durable and its motions are reproducible and precise at the sub-micrometer level. Installable on beamlines or home x-ray sources, the system consists of a uni-body quad collimator, a magnetically indexed kinematic mount, and a precision motion system, which work together to provide micrometer-sized beams of various sizes to a sample.

Argonne's Quad Collimator is easy to remove and replace as needed to accommodate changing experimental conditions. The device's precision motion control and ability to store the coordinates of each mini-beam collimator and scatter guard ensure experimental consistency and reproducibility.

The Argonne Quad Collimator, developed jointly by a team from Argonne and the Life Sciences Institute of the University of Michigan, builds and improves upon prior prototypes. The quality and affordability of the system has enabled scientists to use it routinely to optimize their experiments and expand applications for the use of mini-beams.



At right, the Argonne Quad Collimator mounted on an on-axis visualizer.

Users from institutions around the United States tested the new Quad Collimator, providing enthusiastic comments, such as the ones shown below.

"The mini-beam performance was superb. There were no glitches."

"Excellent. We visited the beamline to take advantage of the mini-beam. It definitely lived up to our expectations."

"It worked great and allowed us to collect usable data for crystals that would have been twinned with a larger beam size."

For further information about the technology and licensing possibilities, please contact Paul Betten at (630) 252-4962 or betten@anl.gov.