Sole Source Justification for a 200x200mm long KB system from the University of Chicago Machine shop (quote 070104).

The MHATT-CAT beamlines (U. of Michigan-Howard U.-ATT) are operated by the UofM and the Advanced Photon Source (APS). To reach a few micron spot size with the monochromatic beam at the MHATT-CAT 7BM beamlines, Jim Penner-Hahn needs to procure a dynamically figured KB mirror system. These system focus an X-ray beam horizontally and vertically to achieve unprecedented spot sizes. The only 200mm long system available in the US is sold by the University of Chicago Machine shop following an optical design by Peter Eng, who is one of the best X-ray optical expert in the world. Peter Eng is a resident of the APS, and provides help as well for the system he designed, so not only does one get an excellent system, but also user support to optimize the device. I have no reservation with his system since MHATT-CAT already owns another system designed by him. We have the earlier version that has two shorter mirrors each 100 mm long which have been used heavily at MHATT-CAT and at many beamlines at the APS. The new system allows to focus 7 time more X-rays than the old one so it will be best suited for the less brilliant beams of the 7BM beamline. The new system is also fully compatible with the control system that was designed at S7 to align and focus the beam with these mirrors so this fact make it even more worthwhile to procure this system as it will allow us to use at time this new system with the existing controls infrastructure. This system will also improve the operation of the sector 7 beamlines at the APS as it will provide readily available spares in case the existing bender system breaks. The beamlines in question run 24 hours a day, 5000 hours a year and the availability of hot spares are critical for the successful operation of the beamline and fruitful scientific production.

Dr Eric Dufresne
Senior Res. Assoc. and experienced X-ray optical designer
University of Michigan

Dr. Eric Dufresne
Quote # 070104
The University of Chicago Central Shop is pleased to quote $33,134 for one 200 mm X 200 mm KB Bender with controls and Helium enclosure.

1 - 200 mm x 200 mm KB Bender
----------$ 17,100
2- One set of electrical components that control and support one Kirkpatrick-Baez X-Ray Mirror Bender. The electrical components comprise all Bipolar Stepping motors, motor drivers and VME interfaces with cables. The cost includes assembly, test and calibration with the mechanical assembly.
----------$11,500
3- 200 mm x 200 mm He Enclosure
---------- $ 4,534

-----Total Cost $33,134

The KB Bender unit as quoted consist of the following.
The complete system includes:
1) A pair of benders (Horizontal and Vertical) with each bender actuated by four motors (eight motors total). Two motors (Newport MFM stages) applying the up and down stream bending moments, one motor (Newport MFM stage) translates the mirror along its surface normal, allowing the mirror to be centered on the beam and the fourth motor operates a cam tilt drive with an angular range of about +/- 20 mrad (rotating about the center and surface of the mirror) used for setting up the incident angle. The pair are held in mutual registration by a common support to an adjustable tripod for mounting to a table.
2) Each bender is connected to a vacuum tight feed through with a rubber O-ring and a jam nut that can seal the system within the He enclosure.
3) A set of ~ 50 ft driver cables.
4) An eight channel driver box that takes as inputs step and direction through either two a "E500" like ribbon cable or two DB 25's.
5) A transition board for a VME crate supporting the use of an OMS 58 eight channel stepping motor controller. ***Note: Mirrors are not included with this quote.***

A 200 mm x 200 mm He enclosure is available for $4,534.00. The He enclosure is designed to be compact so that you could work close to the end of the last mirror (200 mm)and still get a 45 deg microscope in to view the sample.

Delivery will be 10 weeks from date of order.
Thanks for considering our services.

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