

ESRF KB Focusing Mirrors – Present and Future

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Kirkpatrick – Baez type dynamic focusing optics based on in house designed “*weak link*” mirror benders have become a key beam line component and are now extensively used at the ESRF.

An overview of the multi stage production process of a standard KB, from machining to mechanical and optical setup through to final delivery is given.

Stringent demands in the field of nano focusing require the development of higher performance, fully integrated systems.

A global philosophy for extreme thermal and mechanical stability and full beam line integration-mandatory to nano focusing - is proposed. The critical issues are exposed in two main categories: thermal and mechanical.

A high stability thermal environment setup, including methods used to maximize isolation from variable exterior sources is described. Data showing the correlation between temperature and beam stability is commented.

Mechanical issues addressed include material choice, mirror clamping methods and critical machining tolerances. Commercially available actuators are often unsuitable for mirror bending applications due to size, load capacity or compatibility with standard drive electronics. Details are shown of a compact high load microjack, developed specifically for ESRF KB applications.

The importance of highly purity repeatable mechanical displacement (incidence angle and curvature stability) in open loop systems is stressed.

An overview of an integrated experimental setup is shown with particular attention to the optimization of working space around the sample. Space saving design is addressed and propositions based on state of the art elliptical polishing methods for more compact, fixed focus KB's are made.