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Design and testing of a new simple continuous bent sagittal-focusing monochromator

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A continuous bent sagittally focusing monochromator has been designed and built. The monochromator is compatible with present single point bender apparatus designed for polygonal (ribbed) triangular sagittal focusing monochromators. This monochromator implements a new design concept taking advantage of a tapered rectangular wafer to allow for sagittal bending while simultaneously minimizing anticlastic bending. The monochromator was optimized to operate at x-ray energies in the range of 5 to 25 keV. The design was derived from finite element analysis using ANSYS. The monochromator performance was tested by means of an apparatus implementing an x-ray tube source and a double crystal configuration. This method yields precise contour maps of the entire monochromator surface. Details of the monochromator design, test apparatus, and corresponding results will be presented.