

Opto-mechanical analyses for performance optimization of lightweight grazing-incidence mirrors

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New technology in grazing-incidence mirror fabrication and assembly is necessary to achieve sub-arcsecond optics for large-area x-ray telescopes. In order to define specifications, an understanding of performance sensitivity to design parameters is crucial. MSFC is undertaking a systematic study to specify a mounting approach, mirror substrate, and testing method. Because the lightweight mirrors are typically flimsy, they are susceptible to significant distortion due to mounting and gravitational forces. Material properties of the mirror substrate along with its thickness and dimensions significantly affect the distortions caused by mounting and gravity. A parametric study of these properties and their relationship to mounting and testing schemes will indicate specifications for the design of the next generation of lightweight grazing-incidence mirrors. Initial results will be reported.