

Bifocal Miniature Toroidal X-ray Mirrors

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We have fabricated a bifocal miniature toroidal mirror that horizontally and vertically focuses to two different locations. The mirror produces a 100 μm horizontal by 25 vertical μm focus 50 mm from the tip of the optics, and a 35 μm horizontal by 100 vertical μm focus 150 mm from the tip of the optics. This mirror was made to provide a smaller foot print of beam for GIWAXS, while at the same time focusing the beam in the horizontal direction on the detector. At CHESS we traditionally use glass single-bounce monocapillary optics in a wide range of x-ray experiments to get a fine 5 to 20 μm x-ray spot. This miniature toroidal mirror was made by designing and fabricating an x-ray focusing capillary, in which the sagittal and meridional focusing is decoupled, and only a quadrant of the accepted annulus is used for focusing.