

## **Diamond X-ray Lens Development**

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Next generation light sources, diffraction-limited storage rings, and high repetition rate free electron lasers will significantly increase the average brightness of the generated X-ray beams. These machines will require X-ray refractive optics with precise dimensional control and smooth surfaces that are capable of handling large heat loads. Diamond refractive optics elements are being considered for these applications. Such optics elements have to be micro machined by means femtosecond laser pulses. The key advantage of such manufacturing method is in the short duration of the laser pulse. Unlike nanosecond pulses from standard laser cutters, femtosecond pulses only ablate the material and do not lead to thermal fatigue, subsequent crystalline defect formation and reduction in the quality of X-ray optical properties. In this paper we will report on recent results and manufacturing process development.