Abstract Submitted
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Investigation of Variable Radii Crystal Spectrometers for HEDP Applications Through X-Ray Raytracing[1] MATT SLOMINSKI, Northwest Missouri State Univ, NOVIMIR PABLANT, MANFRED BITTER, KENNETH HILL, LAN GAO, BRIAN KRAUS, Princeton Plasma Physics Laboratory, JAMES KRING, Auburn University, YEVGENIY YAKUSEVICH, University of California, Santa Barbara — X-Ray raytracing results will be presented for a family of new crystal geometries that have been proposed for spectrometers to study High Energy Density Physics (HEDP) experiments. These geometries, which feature in common variable radii of curvature across the crystal, are expected to dramatically improve achievable wavelength resolution and total throughput. The most important feature of these geometries is that they allow crystals of arbitrary size to be utilized with little or no degradation in focusing and wavelength resolution. To evaluate the performance of these designs, a new x-ray raytracing code, XICSRT, has been developed. Raytracing and performance metrics will be presented for three crystal geometries: the multi-cone, modified toroid, and sinusoidal spiral. The Ray-Tracing results will be compared to analytical calculations, and in the case of the multi-cone crystal also to experimental measurements made with visible light. Finally a study of optic size and surface quality will be presented.

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