

Abstract Submitted
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Photon Throughput Calculations for a Spherical Crystal Spectrometer¹ C. J. GILMAN, Davidson College, M. BITTER, L. DELGADO-APARICIO, P. C. EFTHIMION, K. HILL, B. KRAUS, L. GAO, N. PABLANT, Princeton Plasma Physics Laboratory — X-ray imaging crystal spectrometers of the type described in refs. [1, 2] have become a standard diagnostic for Doppler measurements of profiles of the ion temperature and the plasma flow velocities in magnetically confined, hot fusion plasmas. These instruments have by now been implemented on major tokamak and stellarator experiments in Korea, China, Japan, and Germany and are currently also being designed by PPPL for ITER. A still missing part in the present data analysis is an efficient code for photon throughput calculations to evaluate the chord-integrated spectral data. The existing ray tracing codes cannot be used for a data analysis between shots, since they require extensive and time consuming numerical calculations. Here, we present a detailed analysis of the geometrical properties of the ray pattern. This method allows us to minimize the extent of numerical calculations and to create a more efficient code. [1] M. Bitter, *et al.*, *Rev.Sci.Instrum.* 75, 3660(2004) [2] A. Ince-Cushman, *et al.*, *Rev. Sci. Instrum.* **79**, 10E302 (2008)

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