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10.33 X-ray Spectrometer Throughput Model for Flat Bragg Crystal Spectrometers on Laser Plasma Facilities

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At large laser facilities such as OMEGA and NIF, x-ray spectrometers are provided by the facility. These spectrometers are often used as backlighter monitors or to diagnosis plasma conditions. Often the calibration of these spectrometers is unknown or out of date. As a remedy to this for flat crystal spectrometers, a model with a ray trace method for is described which can be used with only basic information regarding the optical design of the spectrometer. This model is then used to output photometric throughput estimates, dispersion, solid angle, and spectral resolution estimates. This model is applied to three different flat crystal spectrometers at the National Ignition Facility (MACS and SSI) and University of Rochester OMEGA laser facilities (XRS). This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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