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Absolute soft x-ray calibration of laser produced plasmas using a focusing crystal von Hamos spectrometer TYLER WEEKS, MIKE JOHNSON, MATT HARRISON, SCOTT BERGESON, Brigham Young University, ALEXANDER SHEVELKO, Lebedev Physical Institute (FIAN) — Absolute x-ray calibration of laser-produced plasmas was performed using a focusing crystal von Hamos spectrometer. The plasmas were created by a high repetition rate Nd-YAG laser (0.53 μm/200 mJ/3 ns/10 Hz) on massive solid targets (Mg, Al, Fe, Cu, Mo, Ta). Cylindrical mica crystal (radius of curvature R=20 mm) and a CCD linear array as a detector (Toshiba model TCD 1304AP) were used in the spectrometer. Both the mica crystal and CCD linear array were absolutely calibrated in a spectral range of $\lambda = 7 - 15\mathring{A}$. The spectrometer was used for absolute spectral measurements and the determination of the plasma parameters. High spectrometer efficiency allows for the monitoring of absolute x-ray spectra, x-ray yield and plasma parameters in each laser shot. This spectrometer is promising for absolute spectral measurements and for monitoring of laser-plasma sources intended for proximity print lithography.

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