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Development of a shortpulse laser-driven 15.7 keV x-ray probe for bent-crystal imaging and spectroscopy M. SCHOLLMEIER, M. GEISSEL, P.K. RAMBO, J. SCHWARZ, A.B. SEFKOW, M. VARGAS, J.L. PORTER, Sandia National Laboratories, NM, USA — High energy x-rays above 10 keV are needed to probe HEDP experiments with dense, high-Z samples. Shortpulse lasers were shown to be more efficient to generate above-10 keV x-rays than ns lasers. We have used Sandia's Z-Petawatt laser to drive a 15.7 keV, Zr K-alpha x-ray source. A set of bent-crystal spectrometers and imagers was characterized for their throughput and spectral or spatial resolution. Ray-tracing with a newly developed, GPU-accelerated Monte-Carlo code has been done to evaluate the measurements. Estimates of the system performance at the kJ level have been made to evaluate its potential application for bent-crystal backlighting or x-ray Thomson scattering at Sandia's Z-machine. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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