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Improved X-ray conversion efficiency using cavity backlighter sources from 7.2keV to 11.6keV G. N. HALL, Lawrence Livermore National Laboratory, C. M. KRAULAND, General Atomics, San Diego, California 92121, USA, G. E. KEMP, O. L. LANDEN, K. YOUNGBLOOD, R. HEREDIA, C. CASTRO, N. B. THOMPSON, M. J. AYERS, E. R. CASCO, Lawrence Livermore National Laboratory, Livermore, California 94550, USA — X-ray sources consisting of small (1mm diameter) cylindrical cavities have been developed for use as backlighters on the NIF. These sources use 8 NIF beams to irradiate the inner surface of the cavity and demonstrate significantly improved laser-to-X-ray conversion efficiency over traditional flat foil sources. Data suggests this improved efficiency is due to the formation of a stagnation feature on the axis of the cavity. Since the direction of the plasma flow in these sources is predominantly perpendicular to the axis of the cavity, these sources do not exhibit a Doppler shift when viewed along the cavity axis. When used as a backlighter for the narrow-bandwidth Crystal Backlighter Imager (CBI), a spherically-bent crystal imaging system on the NIF, the lack of Doppler effects can further improve the performance of the imager. Spectral and spatial measurements determining conversion efficiency, source size and dynamics will be presented for cavity sources made of Cobalt (7.2keV), Germanium (10.2keV) and Selenium (11.6keV). Additional results will be presented from experiments in which cavity backlighter sources were coupled to CBI, demonstrating both significantly improved signal and no measurable Doppler shift. Prepared by LLNL under Contract DE-AC52-07NA27344.

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