X-ray image and x-ray burst features of under-dense plasma produced in high-density gas jets on the Leopard Laser at UNR

K.A. SCHULTZ, V.L. KANTSYREV, A.S. SAFRONOVA, J.J. MOSCHELLA, P. WIEWIOR, V.V. SHLYAPTSEVA, M.E. WELLER, E.E. PETKOV, I.K. SHRESTHA, A. STAFFORD, M.C. COOPER, University of Nevada, Reno, NV 89557 USA — Results of Ar and Kr gas-puff experiments performed on the high-power Leopard laser at UNR are presented. The Leopard laser operated in two regimes: 350 fs, 40 TW pulse or 0.8 ns, 25 GW pulse with wavelength of 1.057 μm. A supersonic linear nozzle was compared with a cylindrical sub-sonic nozzle. Diagnostics included two sets of filtered Si-diodes, x-ray pinhole cameras, x-ray spectrometers, and PCDs. Specifically, x-ray images and structure of x-ray bursts are investigated and compared as a function of the linear or cylindrical gas jet, laser pulse duration, and target gas. Strong anisotropy with respect to laser beam polarization was observed in the x-ray output of the linear gas jet. Also, the addition of Kr to an Ar gas jet increased the intensity of the x-ray output compared to a pure Ar jet. The importance of analysis of x-ray burst features for better understanding the mechanisms of the laser energy to x-ray conversion efficiency and future research directions are discussed.

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Kimberly Schultz
University of Nevada, Reno

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