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LBS GatlingGun13A

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Disclaimer

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The High Energy Density Laboratory Physics (HEDLP)-funded Eagle nebula project, in collaboration with the LLNL/ University of Nevada Photoionization / Black Hole Physics effort, has successfully executed the first day of Laboratory Basic Science (LBS) Long Duration Radiator shots, performed at the University of Rochester Laboratory for Laser Energetics Omega EP Laser. This experiment employed a novel technique used a copper multi-hohlraum target with 3 hohlraum filled with a 4mg/cc TPX foam fill to act as a gas surrogate. Each hohlraum was driven with an Omega EP UV beam with either a 6ns pulse with 3.3kJ energy or 10ns pulse with 4.3 kJ. Each hohlraum was heated in succession to generate an 18ns or 30ns, 100 eV x-ray source for future laboratory astrophysics studies. The x-ray source was characterized with the CEA µDMX diagnostic and VISAR using a Quartz shock sample with a CH ablator over a single hohlraum. The Shot day was successful with six hohlraum shots on Omega EP with two 30ns x-ray drive shots. The data indicated that the novel foam-filled multi-hohlraum ('Gatling Gun') long –duration source performed as designed with all three hohlraums lighting up without significant inter-hohlraum interference (Figure 1). In addition the x-ray drive source was able to illuminate a Ti photoionization demonstration physics package with a 90 to 100 eV x-ray drive, generating Ti L-shell band radiation as expected. This source will next be applied to study ablation-driven hydrodynamics experiments relevant to the Eagle nebula and use the source and further develop the photoionization studies with a controlled 30ns x-ray source.

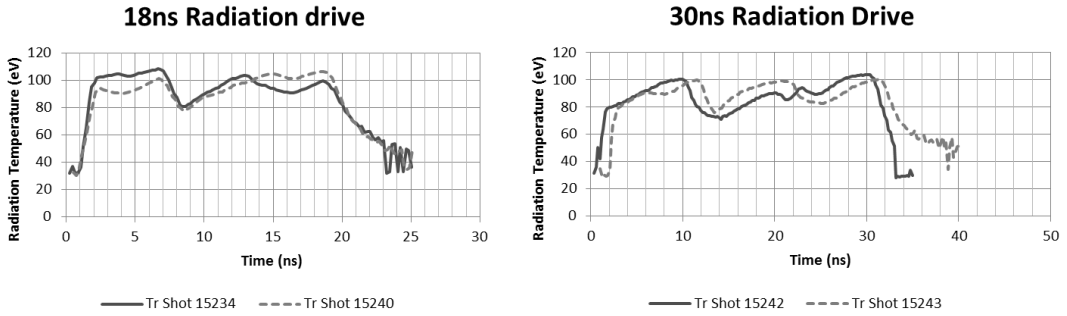

Figure 1): Radiation temperature generated from the Gatling gun target measured with µDMX.

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