

Abstract Submitted
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Examining prepulse and beam spillover effects in compound parabolic concentrator targets in HYDRA.¹ GINEVRA COCHRAN, SCOTT WILKS, ANDREAS KEMP, ANDREW MACPHEE, ANDREW MACKINNON, Lawrence Livermore National Laboratory — High intensity laser pulses can be used to produce MeV energy x-rays which can radiograph high energy density plasmas, providing important insight into a range of problems including inertial confinement fusion and laboratory astrophysics. Our team has experimentally demonstrated using the NIF-ARC laser that compound parabolic concentrator (CPC) targets dramatically improve x-ray production compared to a flat target [MacPhee et al. *Optica* **7**, 129-130 (2020)]. CPCs increase energy concentration at the cone tip and reduce lateral plasma expansion at the cone tip, creating a long scale-length pre-plasma, which can enhance laser absorption. We will present RZ and 3D HYDRA simulations of plasma expansion due to pre-pulse and how this affects the interaction of the main high energy pulse. This is relevant for understanding single beam interactions and also when used as a multiple pulse target which could potentially produce MeV x-rays over many nanoseconds.

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