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Generation of MeV photons with kJ multi-ps laser pulses[1] NUNO LEMOS, ARTHUR PAK, DEAN RUSBY, PAUL KING, Lawrence Livermore Natl Lab, ISABELLA PAGANO, University of Texas at Austin, ADEOLA AGHEDO, Florida AM University , RUSBERRY SIMPSON, Plasma Science and Fusion Center Massachusetts Institute of Technology , SHAUN KERR, JACKSON WILLIAMS, FELICIE ALBERT, SCOTT WILKS, ANDREAS KEMP, CRAIG SIDERS, ANDREW MACPHEE, O. L. LANDEN, ANDREW MACKINNON, Lawrence Livermore Natl Lab — Studying high energy density (HED) matter is expanding our understanding of inertial confinement fusion, astrophysical systems, planetary interiors and fundamental plasma physics. Laser produced x-rays are key tools in this exploration due to their ability to passively probe/radiograph such matter. To radiograph high areal density objects, broad band x-ray sources require a large flux (10ˆ13-10ˆ14 photons/steradian/MeV) of >2 MeV photons. In this work we generate a high yield x-ray source through bremsstrahlung by irradiating a high-Z target with kJ, ps laser pulses. We control the laser to target coupling by changing the plasma scale length, the laser intensity and by using a range of advanced targets, such as compound parabolic concentrator plasma optics to increase the laser intensity for large F/# laser systems. Modeling suggests that these targets can increase the laser intensity by as much as 100x making them very attractive for high F/# systems such as NIF ARC and PETAL at LMJ.

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