

Abstract Submitted
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Positron–Electron, Pair-Plasma Production on OMEGA EP J. MYATT, A.V. MAXIMOV, R.W. SHORT, Laboratory for Laser Energetics, U. of Rochester — It is shown that an e^+e^- pair-plasma can be created on OMEGA EP, a feat yet to be achieved in the laboratory. We calculate that a yield of between 10^{11} and 10^{12} positrons can be produced on OMEGA EP by a combination of the Bethe–Heitler conversion of hard x-ray bremsstrahlung¹ and the trident process,² assuming a total laser energy of 5 kJ. For this expanding e^+e^- cloud to be a plasma, there must be many particles in a Debye sphere, and the cloud must be many Debye lengths in size. A magnetic field produced by a second OMEGA EP beam will provide the necessary confinement. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-92SF19460.

¹J. D. Bjorken and S. D. Drell, *Relativistic Quantum Mechanics*, International Series in Pure and Applied Physics (McGraw-Hill, New York, 1964); D. A. Gryaznykh, Ya. Z. Kandiev, and V. A. Lykov, JETP Lett. **67**, 257 (1998); K. Nakashima and H. Takabe, Phys. Plasmas **9**, 1505 (2002).

²E. P. Liang, S. C. Wilks, and M. Tabak, Phys. Rev. Lett. **81**, 4887 (1998).

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