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Laser-produced pair plasma in a magnetic mirror GENNADY FIKSEL, Univ of Michigan - Ann Arbor, H. CHEN, M.R. EDWARDS, J. VON DER LINDED, T.A. LINK, LLNL, Livermore CA, J. PEEBLES, LLE, Rochester NY, L. WILLINGALE, Univ of Michigan - Ann Arbor — Confinement of laser-produced positron-electron pair plasma in a magnetic mirror was studied on the Omega EP facility of the Laboratory for Laser Energetics (LLE) of the University of Rochester, NY. The plasma was produced by interaction of a high-intensity, 800 J, 10 ps laser beam with a 1mm-thick Au target. Two MIFEDS current generators discharged a 30 kA, 0.5 ms current pulse through two 4-loop magnetic coils. The coils, each with an inner diameter of 10 mm, were separated by 15 mm creating a magnetic mirror configuration with a mirror field of 15 T and a mirror ratio of 2.5. The particle losses and their energy spectra were measured by several magnetic particle energy analyzers situated around the target. To optimize the positron confinement, a parallel campaign on increasing the yield of low-energy positrons was conducted. The positron energy spectra were varied by manipulating the sheath electric field at the back of positron target using a secondary plasma produced by a 1 ns laser beam. The experimental results and their comparison to simulations will be presented. This work is supported the U.S. Department of Energy by LLNS, LLC, under Contract No. DE-AC52-07NA27344 under LDRD 20-LW-021. LLNL-ABS-811921.

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