
Recent Advances in Relativistic Electron-Positron Pair Production Using High Power Lasers

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Intense lasers are now the brightest source of relativistic electron-positron pair jets in the laboratory. Up to 10^{12} highly relativistic pairs are routinely produced in experiments using 1 to 10 ps lasers with energies from 100 - 2000 J, focused to intensities between 5×10^{18} to 10^{21} Wcm⁻² [1, 2, 3, 4, 5, 6]. The experiments produce jets of ions, electrons, and positrons from which the pairs can be focused and manipulated [1, 3, 6]. If the plasma condition is met, laser-generated pair plasmas can be exploited for laboratory experiments mimicking physical processes in various astrophysical systems including Gamma Ray Bursts [5, 6]. This talk will highlight recent experimental results using large laser facilities including Omega EP [1, 3, 4, 6]. and NIF ARC [2] and discuss the prospects in this research area.

Acknowledgment: This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344 and funded by the LLNL LDRD program under tracking code 17-ERD-010 and 20-LW-021.

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