LENGTH SCALING OF THE ELECTRON ENERGY GAIN IN THE SELF-GUIDED LASER WAKEFIELD REGIME USING A 150 TW ULTRA-SHORT PULSE LASER BEAM


Abstract

Recent laser wakefield acceleration experiments at the Jupiter Laser Facility, Lawrence Livermore National Laboratory, will be discussed where the Callisto Laser has been upgraded and has demonstrated 60 fs, 10 J laser pulses. This 150 TW facility is providing the foundation to develop a GeV electron beam and associated betatron x-ray source for use on the petawatt high-repetition rate laser facility currently under development at LLNL. Initial self-guided experiments have produced high energy monoenergetic electrons while experiments using a multi-centimeter long magnetically controlled optical plasma waveguide are investigated. Measurements of the electron energy gain and electron trapping threshold using 150 TW laser pulses will be presented.

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