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**Initial Experimental Results on a Pulse Line Ion Accelerator**[1]

PRABIR K. ROY, WILLIAM L. WALDRON, SIMON S. YU, JOSHUA E. COLEMAN, ENRIQUE HENESTROZA, FRANK M. BIENIOSEK, MATTHAEUS LEITNER, PETER A. SEIDL, DAVID BACA, WAYNE G. GREENWAY, SHMUEL EYLON, LOUIS L. REGINATO, GRANT B. LOGAN, Lawrence Berkeley National Laboratory, DAVID P. GROTE, ALEX FRIEDMAN, Lawrence Livermore National Laboratory, RICHARD J. BRIGGS, SAIC, Alamo, California 94507, USA, RONALD C. DAVIDSON, Princeton Plasma Physics Laboratory, New Jersey 08543, USA — A new method of accelerating intense ion bunches has been investigated. The Pulse Line Ion Accelerator (PLIA) is best suited as an accelerator for intense bunches with pulse lengths of tens of cm. In a first beam dynamics validation experiment for the new PLIA concept, the predicted energy amplification and beam bunching were experimentally observed. Beam energy modulation of -80 keV to +150 keV was measured using a PLIA input voltage waveform of -21 kV to +12 kV. Ion pulses accelerated by 150 keV, and bunching by a factor of four were simultaneously achieved. The measured longitudinal phase space and current waveform of the accelerated beam are in good agreement with 3-D particle-in-cell simulations. Here we present initial experimental results of the PLIA as a proof-of-principle (POP) of the concept.

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