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Numerical Simulations of a Pulse Line Ion Accelerator.[1] ENRIQUE HENESTROZA, SIMON S. YU, Lawrence Berkeley National Laboratory — The Neutralized Drift Compression Experiment (NDCX) is being constructed at the Lawrence Berkeley National Laboratory. NDCX will help develop novel, still unexplored beam manipulation techniques in order to establish the physics limits on compression of heavy ion beams for creating high energy density matter and fusion ignition conditions. A critical early component being developed in this series of experiments is the accelerating scheme for the high-current, short-bunch ion beams that are of interest for HEDP applications. The Pulse Line Ion Accelerator (PLIA) uses a slow-wave structure based on a helical winding, on which a voltage pulse is launched and propagated to generate the accelerating fields. An oil dielectric helix has the ability to accelerate ion bunches to energies much greater than the peak applied voltage and over distances much larger than the ramp length. Low peak voltage experiments ranging from 10-80 kV have begun on a 1-m PLIA test section to verify the ability to accelerate an ion bunch and to investigate breakdown issues. Short-pulsed, pencil-like beams with energy ranges of 200-400 keV have been used for the acceleration experiments. Numerical simulations of the PLIA beam dynamics will be presented.

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