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Neutralized drift compression for short intense ion pulses

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The Neutralized Drift Compression eXperiment II (NDCX-II) is an ion accelerator at Lawrence Berkeley National Laboratory with the intention to study ion-driven high energy density physics relevant to inertial fusion energy research in the warm dense matter regime. Simulations have shown that a target heating up to 1 eV is possible for an area in the order of mm² at thin metal foils by using uniform Bragg peak heating from 1 MeV Helium. The accelerator manages to compress the initial beam pulse by a factor of 100 in longitudinal direction and by a factor of more than 10 in radial direction. This is made possible by applying a ramped acceleration voltage that creates an inverted head to tail velocity profile. To overcome the limitations of space charge, NDCX-II uses beam propagation areas where a surrounding plasma provides free electrons to neutralize the beam and to enable further compression. With this unique capabilities NDCX-II offers new insights into beam dynamics and provides a platform for target experiments at the same time.

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