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A space-charge neutralizing plasma channel for an intense beam[1]

P.K. ROY, P.A. SEIDL, LBNL, J.J. BARNARD, LLNL, J.E. COLEMAN, J.A. DUERSCH, LBNL, UCB, A. FRIEDMAN, LLNL, E.P. GILSON, PPPL, J.Y. JUNG, M. LEITNER, B.G. LOGAN, LBNL, D. OGATA, LBNL, UCB, A.B. SEFKOW, PPPL, W.L. WALDRON, LBNL, D.R. WELCH, Voss Scientific, HIF-VNL COLLABORATION — Ion bunches have been suggested as an attractive means to heat matter to the warm dense matter, or strongly coupled plasma, regime (Temperature $\sim$ 0.1 to 10 eV). For a K^+ beam at 0.4 MeV, $\sim$1 J/cm^2 is required to reach 1 eV in solid Aluminum. Also the pulse duration must be short ($<\sim$ 2 ns) to avoid hydrodynamic cooling. A spot radius $\sim$0.5 mm, and current $\sim$10 A, would enable this flux level and pulse duration. The required current will be achieved by compressing the beam axially. To further increase the beam intensity on target, we will use an 8T solenoid, filled with plasma injected from filtered cathodic arc plasma sources. The Neutralized Drift Compression Experiment at LBNL is intended to test these neutralized focusing techniques with the goal of reaching target temperatures $\sim$0.5 eV. Experimental measurements, including the on-axis plasma density distribution and the beam density distribution, will be presented.

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