Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Developing a high-intensity laser-plasma experimental capability for the Pair Plasma Discovery Science campaign on NIF-ARC[1] GERALD WILLIAMS, HUI CHEN, ANTHONY LINK, MARK SHERLOCK, Lawrence Livermore Nat Lab, GENNADY FIKSEL, Univ of Michigan, FREDERICO FIUZA, SLAC Natl Accelerator Lab, EMMANUEL DHUMI'ERES, Univ de Bordeaux, DANIEL KALANTAR, ANDREAS KEMP, SHAUN KERR, Lawrence Livermore Nat Lab, JOOHWAN KIM, Univ of California, TAMMY MA, ANDREW MACKINNON, ANDREW MACPHEE, Lawrence Livermore Nat Lab, MARIO MANUEL, General Atomics, DEREK MARISCAL, DAVID MARTINEZ, BRUCE REMINGTON, Lawrence Livermore Nat Lab, MITSUO NAKAI, Osaka Univ, LOUISE WILLINGALE, Univ of Michigan — The Advanced Radiographic Capability (ARC) laser at the NIF produces high-energy pulses (up to 4 kJ) but has a large focal spot with sub-relativistic intensities (1e18 W/cm2) below that needed for applications such as radiography, and pair creation. Results from the first high-intensity shots on ARC demonstrated a surprisingly high electron temperature of 2.2 MeV [1]. 2D PIC simulations show a dephasing acceleration mechanism where electrons sample a large area of changing laser phase, only achievable using long pulse durations with large spatial scales. The electron temperature was then increased by using parabolic focusing plasma optics [2] where inferred intensity was an order of magnitude compared to a flat target. This enabled the observation of pairs on ARC for the first time [3]. This newly developed high-intensity platform benefits a range of short-pulse, high-intensity laser applications at NIF.

[1]This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract DE-AC52- 07NA27344 and funded by the LLNL LDRD program under tracking code 17-ERD-010 and 19-SI-002.

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Date submitted: 10 Jul 2019 Electronic form version 1.4