Abstract Submitted
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MHD modeling of deuterium-filled dense plasma foci with prescribed noble gas impurities[1] JEFF NARKIS, FABIO CONTI, DAVID HOUSLEY, Center for Energy Research, University of California, San Diego, DANIEL LOWE, National Security Technologies, LLC, FARHAT BEG, Center for Energy Research, University of California, San Diego — Dense plasma foci are an efficient source of fusion neutrons. Though the stagnation physics are highly kinetic, MHD simulations can estimate useful quantities like peak temperature, density, and thermonuclear yield, and provide information related to the axial run-down dynamics, e.g. stability. Presented here are HYDRA simulations for DPFs using two configurations: the driver of the first configuration delivers 1.3 MA in 5 μs to the load and the device has geometry similar (z ˜60 cm, anode and cathode radius of r_a ˜5 and r_c ˜8 cm, respectively) to that used on Gemini at the Nevada National Security Site. The driver of the second configuration delivers 800 kA in 160 ns to the load and has much shorter electrodes (z ˜2-3 cm) at smaller radii (r_a ˜1.25 cm, r_c ˜2.5 cm) to account for the much faster rise time. The effect of impurities (Ar, Kr and Xe) on dynamics, stagnation conditions, and thermonuclear neutron yield is also discussed.

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