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MHD modeling of a MA-class dense plasma focus with a doped-deuterium fill[1] JEFF NARKIS, ERIC HAHN, University of California, San Diego, DANIEL LOWE, National Security Technologies, LLC, DAVID HOUSLEY, FABIO CONTI, FARHAT BEG, University of California, San Diego — It is well-known that the structure and evolution of the plasma current sheath in a deuterium-fill dense plasma focus (DPF) is affected by the presence of mid-to-high Z dopants. Here we present MHD simulations of a MA-class DPF with a hemispherical anode, a similar configuration to that used in recent experiments on the Gemini DPF at the Nevada National Security Site, in which noble-gas dopants are prescribed in varying fractions. A non-LTE, multi-group radiation diffusion model is used to quantify the increased radiative cooling expected by the addition of high-Z dopants. The effect of dopants on the development of instabilities is also studied by seeding the simulations with a density perturbation. Peak currents are varied from two to a few MA to investigate potential variations in sheath dynamics and neutron yield scaling with peak current due to the presence of dopant. It is worth noting that these simulations do not include kinetic effects, such as neutrons produced by beam-target fusion.

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