## Abstract Submitted for the DPP10 Meeting of The American Physical Society

Plasma Dynamics of Capillary Discharges for the BELLA project<sup>1</sup> PETER STOLTZ, Tech-X Corp, AMMAR HAKIM, JOHN LOVERICH, DAVID FILLMORE, Tech-X Corp., JEFFREY JOHNSON, CAMERON GEDDES, ERIC ESAREY, DANIEL MITTELBERGER, STEPAN BULANOV, ANTHONY GON-SALVES, WIM LEEMANS, Lawrence Berkeley National Laboratory — Capillary discharges to form a meter-scale plasma waveguide are important for 10 GeV scale laser plasma accelerator experiments on the BELLA laser in progress at Lawrence Berkeley National Laboratory. We present simulation results of capillary plasma properties, including radial density and temperature profiles, using the Nautilus code. An effect known to play a dominant role is the transfer of heat from the plasma to the capillary wall. We present benchmark results for heat transfer modeling with Nautilus in the regime of interest to capillary discharges. We also discuss the relative importance of diffusion, Ohm's law, and applied solenoidal fields on the radial profiles needed for experiments. For instance, some previous models estimate applied solenoidal fields could increase on-axis temperatures by roughly a factor of two, and we compare with these estimates. Finally, we compare radial profile results with other simulation results and with recent measurements made at LBNL.

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