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Parallel Simulation of Underdense Plasma Photocathode Experiments[1] DAVID BRUHWILER, University of Colorado Boulder, BERNHARD HIDDING, University of Hamburg, YUNFENG XI, GERARD ANDONIAN, JAMES ROSENZWEIG, University of California at Los Angeles, ESTELLE CORMIER-MICHEL, Tech-X Corporation — The underdense plasma photocathode concept (aka Trojan horse) [1,2] is a promising approach to achieving fs-scale electron bunches with pC-scale charge and transverse normalized emittance below 0.01 mm-mrad, yielding peak currents of order 100 A and beam brightness as high as $10^{19} A/m^2/rad^2$, for a wide range of achievable beam energies up to 10 GeV. A proof-of-principle experiment will be conducted at the FACET user facility in early 2014. We present 2D and 3D simulations with physical parameters relevant to the planned experiment.

[1] Hidding et al., PRL 108:035001 (2012).
[2] Xi et al., PRST-AB 16:031303 (2013).

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