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## Recent Work

### Title

Simulation of ionization effects for short intense laser pulses in plasma channels

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### Authors

Bruhweiler, David  
Dimitrov, Dimitre  
Shadwick, Brad  
[et al.](#)

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**Simulation of Ionization Effects for Short Intense Laser Pulses in Plasma Channels**<sup>1</sup> DAVID BRUHWILER, Tech-X Corporation, DIMITRE DIMITROV, Tech-X Corporation, BRAD SHADWICK<sup>2</sup>, Lawrence Berkeley National Lab, ERIC ESAREY, Lawrence Berkeley National Lab, WIM LEEMANS, Lawrence Berkeley National Lab, JOHN CARY, University of Colorado, RODOLFO GIACONE, University of Colorado The laser wakefield accelerator concept requires a plasma channel in order to guide the short, intense laser pulse over many Rayleigh lengths. We will present initial 2-D laser-channel simulations using the particle-in-cell code OOPIC [1], benchmarking our results with simulations from other codes. The tunneling ionization algorithms in OOPIC [2] will be used to assess the effects of residual neutral gas on the pulse propagation and the plasma wake. Interesting effects could include wakefield modification, enhanced trapping, pulse deformation, and induced betatron oscillations. [1] D.L. Bruhwiler et al., Phys. Rev. ST-AB 4, 101302(2001). [2] D.L. Bruhwiler et al., Phys. Plasmas 10 (2003), p. 2022.

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<sup>2</sup>Also Institute of Advanced Physics

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David Bruhwiler  
bruhwile@txcorp.com  
Tech-X Corporation

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