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Reduced 3d modeling on injection schemes for laser wakefield acceleration at plasma scale lengths[1] ANTON HELM, JORGE VIEIRA, LUIS SILVA, GoLP/IPFN Instituto Superior Tecnico, Lisbon, Portugal, RICARDO FONSECA, GoLP/IPFN Instituto Superior Tecnico, Lisbon, Portugal; ISCTE - Instituto Universitario de Lisboa, Lisbon, Portugal — Current modelling techniques for laser wakefield acceleration (LWFA) are based on particle-in-cell (PIC) codes which are computationally demanding. In PIC simulations the laser wavelength λ_0, in μm-range, has to be resolved over the acceleration lengths in meter-range. A promising approach is the ponderomotive guiding center solver (PGC) [1, 2] by only considering the laser envelope for laser pulse propagation. Therefore only the plasma skin depth λ_p has to be resolved, leading to speedups of $(\lambda_p/\lambda_0)^2$. This allows to perform a wide-range of parameter studies and use it for $\lambda_0 \ll \lambda_p$ studies. We present the 3d version of a PGC solver in the massively parallel, fully relativistic PIC code OSIRIS [3]. Further, a discussion and characterization of the validity of the PGC solver for injection schemes on the plasma scale lengths, such as down-ramp injection, magnetic injection [4] and ionization injection, through parametric studies, full PIC simulations and theoretical scaling, is presented. References: [1] D. Gordon et. al., IEEE Trans. Plasma Sci. 28, 1135 (2000) [2] A. Helm et. al., submitted (2017) [3] R. A. Fonseca et. al., Lect. Notes Comp. Sci., 2331, 343 (2002) [4] J. Vieira et al., Phys. Rev. Lett. 106, 225001 (2011)

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