

Abstract Submitted
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Electron acceleration in Compton driven plasma wakes¹ FABRIZIO DEL GAUDIO, THOMAS GRISMAYER, LUIS SILVA, Instituto Superior Tecnico — Several astrophysical emitters like active galactic nuclei, supernovae remnants, and gamma-ray bursts are sources of energetic photons which can propagate across tenuous plasmas. It has been shown that the effect of Compton scattering of the photons onto the electron of the plasmas can excite plasma wakes [1]. We investigate the possible acceleration of electrons in these plasma wakes. Leveraging the scaling laws already derived for wake amplitude, phase velocity, the predict maximum energy gain in the linear and nonlinear regimes. We also analyse the limiting factors which restrain the acceleration process such as the electron dephasing, the driver divergence and depletion. Our results are confirmed by self-consistent particle-in-cell simulations performed with the PIC code OSIRIS where a Compton scattering module has been implemented [2]. Our findings suggest that ultra relativistic acceleration of electrons can occur via Compton driven wakes in extreme astrophysical environments. [1] F. Del Gaudio et al. submitted arXiv:2003.04249 [2] F. Del Gaudio et al. submitted arXiv:2004.11404

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