Abstract Submitted
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Theory of plasma wakes driven by Compton scattering[1] THOMAS GRISMAYER, FABRIZIO DEL GAUDIO, Instituto Superior Tecnico, RICARDO FONSECA, Instituto Universitario de Lisboa, LUIS SILVA, Instituto Superior Tecnico — Photon bursts with a wavelength smaller than the plasma inter-particle distance can drive plasma wakes via Compton scattering [1]. Such wakes are likely to be formed in astrophysical environments where abundant energetic photons are produced. We present here a complete one dimensional theory of this fundamental process, which is compared with the results of PIC simulations enriched with a Compton module [2]. We take into account several parameters such the length of the photon driver, the initial energy density (number density and frequency), and the plasma magnetization. A special focus is also dedicated to the difference with other drivers (laser / particle beam) that excite plasma modes via their effective ponderomotive force. Our results show that Langmuir and extraordinary modes are driven efficiently when the photon energy density lies above a certain threshold. The interaction of photon bursts with magnetized plasmas is of distinguished interest as the generated extraordinary modes can convert into pure electromagnetic waves at the plasma/vacuum boundary. [1] F. Del Gaudio et al. submitted (2020) arXiv:2003.04249 [2] F. Del Gaudio et al. submitted (2020) arXiv:2004.11404

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