Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Wakefield acceleration by incoherent radiation FABRIZIO DEL GAUDIO, THOMAS GRISMAYER, Instituto Superior Tecnico, RICARDO FONSECA, Instituto Universitrio de Lisboa, LUS SILVA, Instituto Superior Tcnico — Particle acceleration is central in many physical scenarios, from collider experiments to extreme astrophysical environments, gamma-ray bursts, supernovae and their remnants. Plasma wakefield accelerators have proven to deliver relativistic electrons in the laboratory by using laser drivers (coherent radiation) or charged particle beams. We show that an incoherent pulse of radiation can excite a plasma wake capable of accelerating particles to relativistic energies. We provide estimates for the wake amplitude, the condition for particle trapping and acceleration, and the maximum achievable energy. This mechanism could be exploitable in the laboratory, and it is an additional mechanism that can contribute to particle acceleration in astrophysics. 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, following the pioneering numerical work of Frederiksen [ApJ 680, L5 (2008)].

Fabrizio Del Gaudio
Instituto Superior Tecnico

Date submitted: 02 Jul 2019 Electronic form version 1.4