

# A plasma-based acceleration method for heavier particles

mercoledì 20 settembre 2023 19:00 (10 30m)

The last decades have seen a growing interest in plasma-based accelerator technology, leading to establishing these techniques in the particle accelerator community [1, 2]. Nonetheless, they are still only effective on particles already traveling close to the speed of light. Unfortunately, this excludes heavier particles (e.g. muons), naturally produced at lower velocities due to the higher masses.

Non-relativistic accelerating wakes can be achieved. For example, cutting-edge methods have recently been devised for shaping the spatio-temporal spectrum of electromagnetic wave packets that produce pulses with variable group velocities [3]. These pulses can propagate with subluminal velocities, making them suitable candidates to drive slower wakes.

This work presents our ongoing research toward a plasma-based acceleration method for non-relativistic particles using accelerating wakes slower than  $c$ . The suggested method has been studied analytically and then tested using 2D and quasi-3D particle-in-cell simulations with the code OSIRIS [4].

[1] T.Tajima and J.M.Dawson, Physical Review Letters 43, 267 (1979)

[2] P.Chen, J. M. Dawson, Robert W. Huff, and T. Katsouleas, Physical Review Letters 54, 693 (1985)

[3] H.E.Kondakci and A.F.Abouraddy, Nature Communications 10, 929 (2019)

[4] Fonseca R.A. et al., Lecture Notes in Computer Science 2331, 342-51 (2002)

**Autore principale:** BADIALI, Chiara

**Coautore:** MALACA, Bernardo (GoLP/ Instituto Superior Técnico); VIEIRA, Jorge (Instituto Superior Técnico); Sig. ALMEIDA, Rafael; SILVA, Thales (GoLP/Instituto Superior Técnico (Lisbon))

**Relatore:** BADIALI, Chiara

**Classifica Sessioni:** Poster session

**Classificazione della track:** WG3: Theory and simulations