ID contributo: **251** Tipo: **Oral contribution**

Observation of resonant wakefield excitation by pulse trains guided in long plasma channels

lunedì 18 settembre 2023 17:05 (20 minuti)

The plasma-modulated plasma accelerator (P-MoPA) scheme [1, 2] provides a route for GeV-scale accelerators operating at kilohertz-repetition-rates driven by picosecond-duration laser pulses. In P-MoPa, trains of pulses are generated from a long, high-energy drive pulse via the spectral modulation caused by a low amplitude wakefield driven by a leading short, low-energy seed pulse. Our simulations, discussed elsewhere in this conference, show that temporal compression of the modulated drive pulse yields a pulse train that can resonantly drive a wakefield, allowing for acceleration of a test electron bunch to 1.5 GeV in a 100 mm long plasma channel [2,3].
We present the results of recent experiments with Astra-Gemini at the Central Laser Facility, UK for parameters relevant to the accelerator stage of the P-MoPA scheme. We demonstrate guiding of 2.5 J pulse trains in a 100 mm long plasma channel. Measurements of the spectrum of the transmitted laser pulse train show that a wakefield was resonantly excited in the plasma channel. We compare these experimental results with numerical simulations.
[1] S.M. Hooker et al., J. Phys. B, 47, 234003 (2014)
[2] O. Jakobsson et al., PRL, 127, 184801 (2021)
[3] J. J. van de Wetering et al., Phys E., 108,015204 (2023)

Autore principale: ROSS, Aimee J. (John Adams Institute for Accelerator Science and Department of Physics)

Coautore: FEDER, Linus; ARCHER, Emily (John Adams Institute for Accelerator Science and Department of Physics); BOURGEOIS, Nicolas (Central Laser Facility, STFC Rutherford Appleton Laboratory,); Dr. CHAPPELL, James (Oxford); COWLEY, James (John Adams Institute for Accelerator Science and Department of Physics); PICKSLEY, Alex (Lawrence Berkeley National Laboratory); WALCZAK, Roman (John Adams Institute for Accelerator Science and Department of Physics); Sig. WANG, Wei-Ting (Oxford); VAN DE WETERING, Johannes (University of Oxford); HOOKER, Simon (John Adams Institute for Accelerator Science and Department of Physics)

Relatore: FEDER, Linus

Classifica Sessioni: WG1:Plasma-based accelerators and ancillary components

Classificazione della track: WG1: Plasma-based accelerators and ancillary components