Contribution ID: **1095** Contribution code: **THAD2** Type: **Contributed Oral Presentation**

First measurements of electron acceleration with plasma density steps at AWAKE

Thursday 5 June 2025 09:50 (20 minutes)

The Advanced Wakefield (AWAKE) experiment is a proof-of-principle accelerator facility at CERN (Geneva, Switzerland). Proton bunches from the CERN Super Proton Synchrotron are used to drive wakefields in 10 metres of laser-ionised rubidium plasma, over which externally injected 19 MeV electrons are accelerated. Run 1 of AWAKE successfully demonstrated the self-modulation of the long proton bunch, and the acceleration of electrons to 2 GeV. Upgrades to the rubidium vapour source during Run 2 have enabled the use of a plasma density step, and variation of the plasma length through the insertion of foils along the source to dump the laser pulse. When placed suitably within the development of self-modulation, the density step is expected to preserve the wakefield amplitude, and therefore accelerating gradient, over longer distances than with uniform plasma. This work presents the first measurements of electron acceleration with a density step, studied as a function of the plasma length.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Author: PANNELL, Fern (University College London)

Co-authors: VAN GILS, Nikita (European Organization for Nuclear Research); BENCINI, Vittorio (European Organization for Nuclear Research); BERGAMASCHI, Michele (Max Planck Institute for Physics); CLAIREMBAUD, Arthur (Max Planck Institute for Physics); COOKE, David (University College London); GSCHWENDTNER, Edda (European Organization for Nuclear Research); JAWORSKA, Helena (University of Groningen); MEZGER, Jan (Max Planck Institute for Physics); MUGGLI, Patric (Max Planck Institute for Physics); RANC, Lucas (Max Planck Institute for Physics); TURNER, Marlene (European Organization for Nuclear Research); WING, Matthew (University College London); ZEVI DELLA PORTA, Giovanni (European Organization for Nuclear Research)

Presenter: PANNELL, Fern (University College London)

Session Classification: THAD:Novel Particle Sources and Acceleration Techniques (Contributed)

Track Classification: MC3: Novel Particle Sources and Acceleration Techniques: MC3.A22 Plasma Wakefield Acceleration