7th European Advanced Accelerator Conference

EAAC2025

Contribution ID: **584** Type: **Oral contribution**

The program of AWAKE towards high-energy electrons for particle physics experiments

Wednesday 24 September 2025 16:40 (20 minutes)

AWAKE at CERN has moved from a proof-of-concept experiment to a facility that develops the proton-driven plasma wakefield acceleration technology to be ready for proposing first particle physics applications in the 2030's. To this aim, the experiment will be significantly upgraded during CERN's Long Shutdown 3 (2026-2028) to demonstrate the acceleration of electrons to energies up to 10 GeV in a single 10-m long plasma source, while controlling the beam quality and to demonstrate the scalability of the process. We present the well-defined roadmap, the scientifc program and challenges of the experiment starting in 2029, where a 150 MeV, 100 pC charge, 200 fs long electron bunch is externally injected into a 10m-long accelerator plasma source. In addition the development of scalable discharge and helicon plasma sources to hundreds of meters length, necessary to reach high energies, is shown. The relevance of the AWAKE developments for other plasma-based accelerator projects as well as first possible particle physics applications are highlighted.

Author: GSCHWENDTNER, Edda

Co-author: AWAKE COLLABORATION

Presenter: GSCHWENDTNER, Edda

Session Classification: PS9: Particle physics applications: proposals, ESPP input, sustainability

Track Classification: PS9: Particle physics applications: proposals, ESPP input, sustainability