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Awake, Advanced Proton-Driven Plasma Wakefield Experiment at CERN

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The Advanced Proton Driven Plasma Wakefield Acceleration Experiment (AWAKE) aims at studying plasma wakefield generation and electron acceleration driven by proton bunches. It is a proof-of-principle R&D experiment at CERN and the world's first proton driven plasma wakefield acceleration experiment. The AWAKE experiment will be installed in the former CNGS facility and uses the 400 GeV proton beam bunches from the SPS. The first experiments will focus on the self-modulation instability of the long proton bunch (rms ~ 12 cm) in the plasma. This instability is used to transform the incoming bunch into a train of short bunches with a period approximately equal to the plasma wavelength, ~ 1.2 mm at a nominal plasma electron density of 7×10^{14} /cc. These experiments are planned for the end of 2016. Later, in 2018, low energy (~ 15 MeV) electrons will be externally injected to sample the wakefields and be accelerated beyond 1 GeV.

The main goals of the experiment will be summarized, an overview of the beam lines, the experimental area, the plasma cell and the diagnostics will be given and the status of the facility will be shown.

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