

AWAKE -- A Proton-driven Plasma Wakefield Experiment at CERN

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High energy intense proton beams such as the in the 7 TeV x 7 TeV Large Hadron Collider at CERN have sufficient energy stored per proton bunch to power and accelerate an electron beam to an energy of 600 GeV if a suitable mechanism could be found to transform all the stored proton beam energy into the electrons. A suitably designed plasma column could be such a 'transformer', with the potential of being able to generate sufficiently high electromagnetic wakefields, upon excitation by the proton beams, to accelerate an electron beam to an energy of 600 GeV in a single pass through the plasma column. The idea will be tested experimentally in a "scaled-down" prototype proof-of-principle demonstration experiment at CERN known as AWAKE. Proton beams of 400 GeV energy will be extracted from the Super Proton Synchrotron and used to excite a specially designed plasma column and the generated wakefields will be sampled by specially prepared electrons from an injector for acceleration. The experiment has been approved by the CERN Scientific Program Committee for some years now and a global collaboration of institutions from across Europe and Russia (and potential Asian and North American collaborators) is busy preparing the experiment in the 2018-2020 time scale. The experimental cave previously used for the Gran Sasso long baseline neutrino experiment is being prepared by CERN to launch this demonstration experiment. I will describe the status of this experiment and its promise for future high energy electron-proton and electron-positron colliders.