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【10】 First electron acceleration in AWAKE, the proton driven plasma wakefield acceleration experiment

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The Advanced Wakefield Experiment, AWAKE, is an accelerator R&D experiment at CERN using for the first time ever a high-energy proton bunch to drive plasma wakefields in plasma and accelerating electrons to the GeV energy scale and, in the future, takes advantage of the large energy store in the proton bunch to reach very high energy gain in a single plasma.

The principle of the AWAKE experiment is described. We show the experimental results of the seeded self-modulation process of the long 400 GeV/c SPS proton bunch transforming the bunch into a train of bunchlets and driving resonantly the wakefields in the 10 m long Rb plasma. We also show the acceleration results to several GeVs of electrons that have been externally injected into these wakefields.

In addition the next steps of the AWAKE experimental program as well as first possible applications of this acceleration scheme will be described.

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