



Gérard Mourou
Nobel de Physique 2018
"a method of generating high-intensity,
ultra-short optical pulses".

CYCLE DE CONFÉRENCES

Séminaire général du département de physique
de l'École polytechnique

EXPERIMENTAL RESULTS OF THE AWAKE EXPERIMENTS: SELF-MODULATION AND ELECTRON ACCELERATION



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Introductory speech by Gérard Mourou

The aim of the AWAKE experiment is to accelerate externally injected electrons in the wakefields driven by a self-modulated proton bunch. The proton bunch is chosen because of the large amount of energy it carries and thus for the long accelerated distance and large energy gain electrons could experience. The first phase of the experiment demonstrated the self-modulation process. It led to a number of new and interesting physics results, such as: seeding of the self-modulation process using two different methods; stability of the wakefields' phase seeding it insures; transition to

instability; growth of the wakefields along the bunch and plasma, observation of the competing hosing instability; etc. In a second phase, low energy electrons (18MeV) were externally injected and accelerated to ~ 2 GeV along the 10m plasma.

I will introduce the physics of the self-modulation process, describe the experimental setup and summarize the experimental results. I will then briefly touch on possible applications for such an acceleration scheme.

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