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 ~2GeV 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.