

An injector for multi-stage Laser Plasma Accelerators

Monday, 3 June 2013 19:30 (30 minutes)

Laser-plasma acceleration (LPA) is extensively studied since many years. The compactness of these systems as well as the unique properties of the electron source make them a promising alternative to conventional accelerators. Among the different research axis, the scientific community has started to work on multiple acceleration schemes with an aim to reach higher energy, preparing for experiments that will be possible to realize on future PW and multi PW laser facilities.

In the context of the new up coming APPOLLON laser facility (10PW -15fs) on the Plateau de Saclay (France), CEA Saclay, LPGP-Université Orsay and LULI-Ecole Polytechnique collaborate to build and optimize an injector for a future 2-stage accelerator. We will present the technical choices that have been made to build the injector, and specially, the gas medium (mixtures with impurities) for ionization injection and control of the trapping processes. The experiments will be performed on UHI100 laser (100TW-25fs - CEA-Saclay).

Related to the ionization injection issue, we will present encouraging results that have recently been obtained at the Lund Laser Centre, Sweden, in a collaboration between LLC, LPGP and CEA using gas mixtures with impurities, comparing LPA in capillaries and in gas jets.

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Session Classification: Wine and Poster Session

Track Classification: Wine and Poster Session