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## Study and design of the acceleration of electrons by Laser Wakefield Acceleration (LWFA) in the CILEX project using WARP

*Wednesday, 16 September 2015 20:00 (30 minutes)*

The Particle-in-cell (PIC) Framework WARP was recently adapted to describe Laser Wakefield Acceleration. It is also well adapted to the modeling of the CILEX project, in which experiments on electron acceleration by multi-stages LWFA using multi-PW APOLLON are in preparation. The strength of this code lies in its ability to treat the whole aspect of a multi-stage accelerator, beginning from the injection of the electron beam in a plasma wakefield, its transport through the electromagnetic focusing devices and finally its acceleration in the plasma accelerator stages.

We have recently improved the physical model of our simulations, we take into account a mixture of gases in modeling the injector because the injection induced by ionization of high Z atoms allows a much better control in the injection process; we use the cylindrical azimuthal Fourier decomposition for plasma-based acceleration. This provides a quasi-3D description of the laser-plasma interaction in underdense plasmas with computational load similar to 2D calculations.

We will present at the conference our latest results on the optimization of a 50 MeV quasi-monoenergetic electron beam injected via ionization of high Z atoms. These results will be compared to the experimental ones.

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