



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 15 October 2015

17:00 -18:00

3rd Floor Seminar Room

“Laser plasma accelerators”

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Abstract

Compact accelerators based on laser plasma cavities, which support hundreds of GV/m electric field [1], deliver today electron beam with unique parameters. In 2004 quasi mono-energetic electron beams have been produced in the bubble regime [2] by focusing intense laser beam in under-dense plasma targets. This efficient bubble regime of acceleration is now currently working in many laboratories over the world. In 2006 stable and quasi mono-energetic electron beams have been demonstrated at LOA using by colliding two laser pulses in under-dense plasma [3]. This last approach is very promising for future applications because of the stability of the electron beams and the easy control of their parameters. The very high brightness and shortness (fs) [4] make them very attractive for many applications and for the development of compact X ray beams [5]. I will present the different regimes of acceleration and relevant applications that have been recently considered at LOA: For medicine to treat the cancer by radiotherapy, for fundamental studies in radiobiology (short-time-scale), for chemistry (radiolysis in the femtosecond range), for material science in automobile and aeronautic industries (for non-destructive dense matter inspection by gamma radiography), and finally for accelerator physics [6].

[1] V. Malka et al., Science 298 (2002)

[2] Dream Beams issue of Nature 431, 538 - 544 (2004).

[3] J. Faure et al., Nature 444, 737 (2006).

[4] O. Lundh et al., Nature Physics 7 (2011)

[5] S. Corde et al., Rev. of Modern Physics 85 (2013)