



Contribution ID: 145

Type: **not specified**

## Acceleration with self-injection and all-optical radiation sources at LNF

*Friday, 28 September 2012 11:10 (25 minutes)*

Laser-plasma acceleration of electrons is currently being explored worldwide as a possible future alternative to conventional accelerators.

In the mean time, existing approaches for accelerating electrons at relativistic energies using compact schemes and relatively high power lasers are being considered for a range of studies aiming at fundamental and applied research.

Among these, the possibility of exploring fundamental open issues of electrodynamics, including radiation reaction effects on accelerated electrons, can be combined with the opportunity of generating bright  $\gamma$ -ray radiation via Thomson and inverse Compton scattering in an all-optical configuration.

A programme has been established at LNF within the Sparclab infrastructure which is dedicated to the exploration of these issues, starting from the generation of a reliable source of relativistic electrons using laser-plasma acceleration with self-injection in gases and aiming at the establishment of a unique experimental configuration in which interaction of laser-accelerated electrons with intense laser pulses occurs at the highest possible electromagnetic field intensities to explore inverse Compton and to demonstrate the use of scattered  $\gamma$ -rays for applications to material sciences and astrophysics. An overview of the underlying physics and a description of the current state of the programme will be given in the presentation.

### References

a on behalf of the SL-SITE and SL-G-RESIST collaboration

- 1 T. Tajima and J. M. Dawson, Phys. Rev. Lett. 43, 267–270 (1979)
- 2 L.A. Gizzi et al., Europ. Phys. Journal - Special Topics, 175, 3-10 (2009).
- 3 L. A. Gizzi et al., Il Nuovo Cimento C, 32, 433 (2009)
- 4 Self Injection Test Experiment (SL-SITE), V INFN Natl. Sci. Comm.
- 5  $\gamma$ -ray Emitter from Self-injected (staged) Thomson Scattering (SL- $\gamma$ -RESIST), V INFN Natl. Sci. Comm.

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**Session Classification:** S5.4 Novel sources: PXR&TR&FEL&Plasma

**Track Classification:** Novel sources: PXR&TR&FEL&Plasma