

Tera-Days: Attività INFN e prospettive per la radiazione THz e le sue applicazioni



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THz emission from the interaction of ultra-short laser pulses with thin solid targets

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The interaction of an ultra-short laser pulse at relativistic intensities is known to produce plasmas composed by hot electrons and energetic ions. The characteristics of the energy transfer from the laser pulse to the plasma components are completely different from longer pulse situations and give rise to a wide range of new phenomena. Among these, terahertz radiation generation is one of the less explored. Several authors already observed the presence of pulsed THz fields in ultra-high-power short pulse interaction with solid targets [1-3]. Using TPX lenses, pyroelectric and electro-optical detectors, we propose an investigation aimed at unveiling the relation between such non-equilibrium process and the resulting equilibrium-plasma. This could be of great interest for predicting the properties of the ion beams generated during the interaction of ultra-high intensity laser pulses with thin targets. Indeed, these setups are currently seen as a promising technology for next-generation tabletop particle accelerators.

References

- [1] Sagisaka, A. et al. (2008), Appl. Phys. B 90, 373-377.
- [2] Li, C. et al (2011), Phys. Rev. E 84, 036405.
- [3] Li, Y. T. et al. (2012), App. Phys. Lett. 100, 254101.

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