Seminar

Institute for Plasma Research

Title : THz radiation generation during laser plasma interaction

Speaker: Dr. Deepa Verma
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Date : 19th July 2021 (Monday)

Time : 10.30 AM

Venue : Online - Join the talk:
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Abstract :

In recent years, tremendous interest shown in using laser-plasma systems as a source for terahertz (THz) radiation generation [1,2]. In this presentation, we will provide an unconventional mechanism to produce THz radiation through a nonlinear localized structure that forms due to the coupling of a laser pulse with plasma [3]. Few electrons get trapped inside the localized cavity and oscillate within, acting as a dipole antenna responsible for the radiation emission. The frequency of this radiation lies in the THz range. We have designed the laser-plasma system to form a localized structure near the plasma vacuum boundary so that the radiation can reach to vacuum before it gets absorbed within the plasma. The THz generation through such an interaction has advantages such as compact size and high damage threshold limit over other established mechanisms.

[1] Sheng, Z.-M., Mima, K., Zhang, J. & Sanuki, H. Emission of electromagnetic pulses from laser wakefields through linear mode conversion. Phys. review letters 94, 095003 (2005).

[2] Kwon, K. B. et al. High-energy, short-duration bursts of coherent terahertz radiation from an embedded plasma dipole. Sci. reports 8, 1–9 (2018).

[3] Kaw, P., Sen, A. & Katsouleas, T. Nonlinear 1d laser pulse solitons in a plasma. Phys. review letters 68, 3172 (1992).