BOOK OF ABSTRACTS

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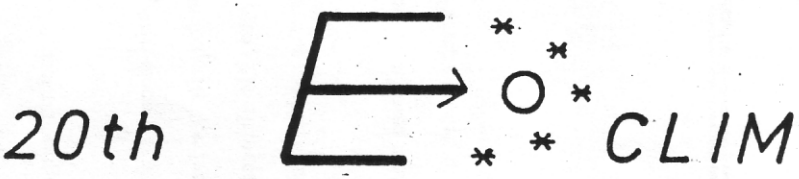

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STUDY OF X RAY EMISSION FROM LASER-PLASMAS PRODUCED FROM THIN FILMS

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We report on a study of x-ray emission from laser-plasmas produced by irradiating thin plastic films ($d \leq 2$ μm, Formvar) with a 1.064 μm Nd laser at intensities up to 5 10^{13} W/cm^2 with a 3 nsec pulse.

The x-ray signal was measured with a silicon p-i-n detector and x-ray images of the emission region where taken with a pin-hole camera on kodak DEF and SB films. Both instruments were filtered with thinAl foils ($d = 1.6$ - 13 μm). Pin-hole pictures showed that x-rays are emitted when the plasma density is still above critical, before the laser burns through. We used the p-i-n detector with different filters to record the bremstrahlung spectrum of our plasma: we could then calculate the electron temperature T_e which was ≤ 300 eV.

Our data evidenced a deviation of spectra from the exponential slope when films were irradiated at intensities ≥ 5 10^{12} W/cm^2. This was connected with the formation of non-thermal tails of hot electrons which have in turn been related to filamentation and TPD instabilities evidenced in our experimental conditions with visible, time-resolved spectroscopic techniques.

The simple dependance of bremstrahlung emission on n_e and T_e, allowed a direct comparison with the predictions of the London and Rosen self-similar model, used to calculate the evolutions of the plasma parameters.