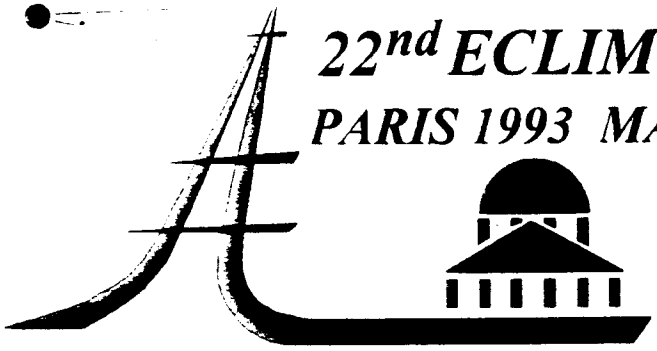

BOOK OF ABSTRACTS

conference organized by
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INTERACTION OF SMOOTHED OR MODULATED LASER BEAMS WITH LONG-SCALE-LENGTH EXPANDING PLASMAS

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The experiment was performed at the SERC Central Laser Facility. Four 600 ps, 1.053 μm beams of the Vulcan laser were used to preform the plasma. Details on plasma production and characterization will be reported in a separate paper to this Conference(*). A fifth beam was delayed by 2.5ns and focused f/15 to interact with the underdense preformed plasma along the symmetry axis at an irradiance from 10^{13} W/cm^2 to 5 10^{14} W/cm^2. This beam was either unsmoothed or smoothed with three different devices, namely random phase plates, induced spatial incoherence, spectral dispersion. Both narrow-band and broad-band regimes were tested. Specially designed phase plates were used on the interaction beam in order to induce controlled intensity modulations in the focal region.

Two second harmonic detection channels were activated in the forward and sideward directions respectively and gave both time-resolved images and time-resolved spectra. An infrared detection channel was set up backward to investigate stimulated Brillouin scattering by calorimetry and time-resolved spectroscopy. The focal spots produced by smoothed or modulated beams were both simulated numerically and detected experimentally. They were then compared with the observed structures of the second harmonic sources. Second harmonic spectra were slighty red-shifted and considerably broaden with respect to the narrowband laser. The second harmonic emission resulted often to be temporally modulated even with temporally smooth interaction pulses. Modulation resulted enhanced when high-Z targets were used. SBS spectra were characterized by two well distinct phases of scattering, the first producing an unusually broad emission with both red- and blue-shifted components, the second with a relatively narrow spectrum moving from the red to the blue side.

(*) L. A. Gizzi *et Al.* : "Production and characterization of long-scale-length expanding plasmas for ICF coronal studies".