

22nd ANNUAL ANOMALOUS ABSORPTION CONFERENCE
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EFFECT OF CONTROLLED MODULATIONS ON THE INTERACTION OF
SMOOTHED AND UNSMOOTHED LASER BEAMS WITH CORONAL PLASMAS

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An experimental study has been performed very recently at the Rutherford Appleton Laboratory (UK) using the "Vulcan" laser facility. Four 600ps, 1054nm beams were focused on 400 μ m diameter 500nm thick aluminium targets at an irradiance of $\approx 1.5 \times 10^{13} \text{Wcm}^{-2}$ in order to preform a plasma. A fifth narrow-band or broad-band beam interacted with the preformed plasma with a given delay. A sixth 100ps, 527nm pulse was used as a probe beam for interferometric measurements of the plasma density distribution. Plasma electron temperature before and during the interaction was obtained by means of X-ray time-resolved spectroscopy.

The laser intensity distribution in the focal spot of the interaction beam was manipulated using phase plate technique in order to generate modulations with a typical scalelength of 100 μ m. The effect of such laser intensity gradients on filamentation instability was investigated by means of time-resolved spectroscopy of Second Harmonic emission (SH) and Stimulated Brillouin Back-Scattering as well as time-resolved imaging of SH emission. Finally we studied the effect of laser beam smoothing techniques including RPP (narrow-band), ISI and SSD (broad-band) on this interaction regime.

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PROGRAM

----- Morning Session, Monday, July 13, 8:30 A.M. ----- (W. L. Kruer, Chair)

ORAL SESSION - Plasma Interactions I (15 minutes each)

- 8:30 Introduction and Welcome
R. L. McCrory, W. Seka.
- 8:45 101 The Angular Variation of Stimulated Brillouin Scattering from Plasmas with Weak but Finite Velocity Gradients;
R.P. Drake, K.S. Bradley, S.H. Batha, D.S. Montgomery, K. Estabrook, H.A. Baldis, T.W. Johnston, R. L. Berger, W.L. Kruer, and R. Procassini.
- 9:00 102 Two-Plasmon-Decay Instability and Raman Scattering in Long-Scale-Length Laser Plasmas;
W. Seka, R.E. Bahr, R.S. Craxton, R.W. Short, A. Simon, D.S. Montgomery, and A. Rubenchik.
- 9:15 103 Effect of Controlled Modulations on the Interaction of Smoothed and Unsmoothed Laser Beams with Coronal Plasmas;
L.A. Gizzi, T. Afshar-Rad, V. Biancalana, P. Chessa, C. Danson, A. Giulietti, D. Giulietti, E. Schifano, S.M. Viana, and O. Willi.
- 9:30 104 Collective Thomson Scattering from the Ion Acoustic Decay Instabilities in Laser Produced Plasma;
K. Mizuno, B. Sleaford, R.P. Drake, K. Baker, B. Bauer, D.M. Villeneuve, and B. La Fontaine.
- 9:45 105 Spatiotemporal Chaos in the Langmuir Decay and its Implications on the Saturation of SRS;
C. Chow, A. Bers, and A.K. Ram.
- 10:00 Coffee Break
- 10:30 106 Excitation of Stimulated Raman Scattering in Laser Hot Spots and its Nonlinear Saturation;
B. Bezzerides, D. DuBois, and H. Rose.
- 10:45 107 Saturation of Stimulated Raman Scattering by the Excitation of Langmuir Turbulence;
D. DuBois, H. Rose, and B. Bezzerides.
- 11:00 108 Signatures of Caviton Collapse Observed in RF Modification of the Ionosphere;
D. Russell, D. DuBois, and H. Rose.
- 11:15 109 Parametric Instability Driven by a Random Phase Plate Laser Beam;
R. L. Berger.