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Guest Editors' Preface: XXVIII ECLIM Rome

The present 28th ECLIM in Rome is a continuation of the series of conferences that started in Frascati, Italy in 1966. These conferences deal with the interdisciplinary subjects of laser interaction with matter, related not only to basic science but also to a wide range of applications. ECLIM is an independent scientific conference, free of any institutional or political influence, keeping science without boundaries.

Present at the 28th ECLIM in Rome were 160 participants who presented 150 papers, from 5 continents, 20 countries and 76 laboratories from Institutes and Universities. Following ECLIM tradition, there were no parallel sessions. Representatives of big, medium, and small laboratories showed the research and development of the interaction of laser with matter through invited, oral, and poster presentations.

As customary, some of the refereed papers will be published in Laser and Particle Beams according to the journal specifications. All submitted contributions will appear in the Conference Proceedings.

It is out of the scope of this short foreword to describe or even to mention all the individual contributions. We were updated with developments in the megajoule laser laboratories from NIF at Lawrence Livermore National Laboratory (USA) and from CEA (France). A comprehensive summary of the activities was given from major laboratories around the globe: China Academy of Engineering Physics (China), GSI and Garching (Germany), ILE Osaka (Japan), LPI (Russia), NRL (USA), PALS (Czech Republic), RAL (UK), Shangai Institute of Optics and Fine Mechanics (China).

Much attention was focused on "fast ignition," where some new ideas were suggested. Calculations and experiments were described in detail while serious criticism was voiced. Vigorous discussions following some of these presentations demonstrated the mood of general interest and a hope for successful ICF energy production.

Another popular subject was the interaction of sub-ps laser pulses with plasmas. The diagnostics for detecting fast electrons and ions were explored. Models for particle production were suggested and experimental evidence for these phenomena were shown in many contributions. The different aspects of the high-order harmonic generation were shown. A theoretical scheme to obtain intensities of 10^{25} W/cm^2 with 50 fs pulses was suggested while, in other presentations, the practical relevance of the contrast for high intensity ultra-short laser pulses was pointed-out. The absorption problems of fs pulses, at medium and high intensities, were explored and general interaction formalism with Hamiltonian approach was given. The propagation of these short pulses for long distances in air with filamentation was presented. The connection between the fs lasers and the popular subject (in other fields) of nano-particles and nanotubes was suggested. Even the much shorter laser pulses, the atto-seconds (10^{-18} s), were explored.

The plasma physics of photon creation was discussed and the practical application of the radiation sources was also shown, in particular, the x-ray lasers.

Inertial confinement fusion problems were comprehensively analyzed. Subjects were viewed from the laser absorption to the compression phase and finally to the nuclear physics, including energy gain. Several speakers presented their experimental and theoretical investigations on plasma instabilities that affect the laser absorption and the hydrodynamic instabilities (Rayleigh-Taylor, Richtmyer-Meshkov) crucial to the compression phase of the fusion fuel. The target design and fabrications issues for ICF were presented. An interesting overview of the "neutron problem" in the "clean" ICF fusion was also given. In all, almost every aspect of laser plasma interaction was covered.

We would like to thank all the participants for creating a pleasant atmosphere during the conference and for presenting such good technical contributions.

We would also like to thank the excellent and diligent team of the ENEA ICF Physics and Technology Group who helped to make this a smooth and enjoyable conference.

In summary, we would like to quote one prominent participant who wrote after the conference, ". . . to thank you all not only for the excellent organization but also for the good choice of the many exciting contributions. It has been a great pleasure."

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