
Guest Editor's Preface: The S. Feliu Conference

This issue of *Laser and Particle Beams* contains 25 papers that were presented at the conference on "Matter in Super-Intense Laser Fields: Short Pulse, Superstrong Laser-Plasma Interactions," held in S. Feliu de Guixols, Spain, from 29 September to 4 October 2001. Almost 100 scientists and young researchers (Ph.D. students and Post Docs) took part in this successful event, despite the terrible terrorist acts of September 11, 2001 in New York, which prevented many speakers from taking part, especially those coming from the United States.

Short pulse, superstrong laser-plasma interactions is a rapidly evolving research field. The recent development of high-energy, short-pulse lasers has led to the discovery of new phenomena in laser interactions with matter, and has opened new perspectives in plasma physics; allowing completely new regimes to be investigated. Relativistic plasmas and strongly coupled degenerate plasmas have become experimentally accessible. Numerical, theoretical, and diagnostics improvements have progressed at the same time. Applications like particle sources, X-rays, and high harmonics generation, fast ignition are foreseen. At the same time, astrophysically relevant experiments and equation of state experiments in the multimegabar regime have been realized, helping our comprehension of the universe. The conference included sessions on astrophysics in the laboratory, equation of state, particle sources from high-intensity lasers, numerical simulations, advancement in ICF and fast ignition, advanced plasma diagnostics including X-ray laser and high harmonics, relativistic effects in strong-field Atomic Physics, and Laser-cluster interactions. One topic of particular relevance was that of astrophysics in the laboratory. This new emerging field promises to be one of the most exciting frontiers of physics in the coming decade. On one hand, it is nowadays possible to reproduce, on small laboratory samples, the conditions of matter inside giant planets and stars and to study their physical characteristics (first of all their equation of state). On the other side, it is also possible to perform scaled experiments to study astrophysically relevant phenomena like shock propagation, development of hydro instabilities, radiation transfer, and radioactive shocks. Many talks at the conference dealt with astrophysics in the laboratory from either the first or the second point of view. Another very important new topic is the generation of intense beams of fast particles (electrons, protons . . .) in laser-plasma interactions at high intensities. This is important both for basic physics and for the possible applications

(for instance, in the field of adron-therapy for fighting cancer). The S. Feliu conference has probably been one of the first international scientific conference to include sessions on these two topics.

The S. Feliu conference was also conceived as a forum for young people (Ph.D. students and Post-Docs). Grants allowed their participation (covering the conference fee or accommodations). A series of short talks gave an opportunity to young researchers to present their latest results. Each session included one long review talk and a couple of invited talks. In addition, poster sessions were also planned.

The conference was supported by the European Science Foundation (ESF) through the EURESCO program and by the European Union through the EUROCONFERENCES Program. Also the FEMTO Program of the ESF supported the conference. The FEMTO program ("interaction of superintense, femtosecond laser fields with atoms, solids and plasmas") was launched in 1998, chaired by C. Joachain, and includes researchers from several European countries (Germany, Italy, France, Belgium, Portugal, Austria, Czech Republic, Sweden, Spain). One of the goals of the program is to bring together researchers working in the field of laser-plasmas and in the field of atoms in intense laser fields, to a common forum for exchanging ideas and establishing scientific cooperation. (News on the ESF FEMTO Program can be found on the web site at www.efs.org/femto). The positive energy between plasma physics and the physics of atoms in intense laser fields is also reflected in some papers presented at the conference and published here.

The scientific committee included D. Batani, P. Agostini, C. Joachain, P. Knight, L. Roso, J. Honrubia, J. Meyer-ter-Vehn, T. Mendoca, M. Koenig, K. Rohlena, W. Sandner, F. Bijkerk. D. Batani (Università di Milano-Bicocca, Italy) is Chairman of the conference and Guest editor of this issue of *Laser and Particle Beams*; P. Agostini (CEA Saclay, France) and M. Koenig (LULI, Ecole Polytechnique, France) are Vice-Chairmen of the conference; and C. Joachain (Université Libre de Bruxelles, Belgium) is Chairman of the ESF FEMTO Programme.

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