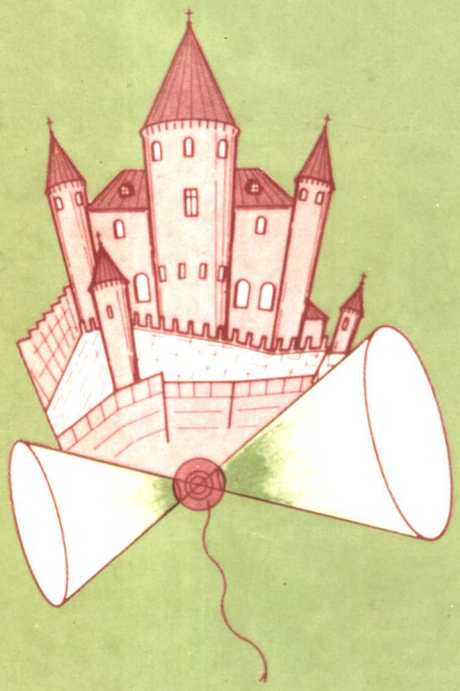

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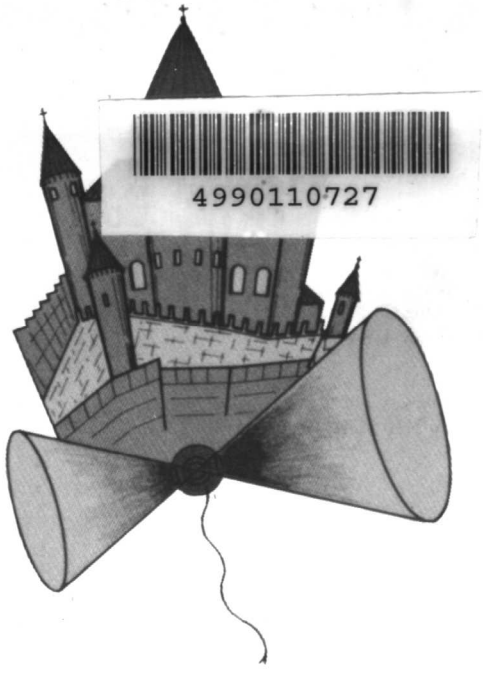

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PREFACE

This book contains the papers presented at the 19th European Conference on Laser Interaction with Matter (19th ECLIM) held in Madrid, 3-7 October 1988 organized by the Institute of Nuclear Fusion of the Polytechnical University of Madrid (UPM). It was sponsored by the National Institute of Industry (INI), the Spanish Nuclear Society (SNE), and the Spanish CICYT.

About 170 scientists from Europe, United States of America, Japan, Canada, Israel, Australia, China and S. Africa, participated in the Conference, with about 160 papers covering topics as: hydrodynamics, radiation, charged particles transport, atomic physics, laser concepts and applications, target implosions, instabilities and particle beams. Professor C. Yamanaka was the keynote speaker, who spoke about the driven ICF targets implosion, he explained the major laser results of the experiments, getting actually 100 times the liquid density of D-T fuel. A panel about: "Future of ICF laser research: Going to breakeven", was moderated by G. Velarde (Chairman of 19th ECLIM) and the panelists represented some of the most important laboratories in the world working in ICF: P.D. Goldstone (LANL), R.L. McCrory (Univ. Rochester), S. Nakai (ILE, Japan), V. Rozanov (P.N. Lebedev), E. Storm (LLNL), J.P. Watteau (Limeil), E. Fabre (Ecole Polytechnique) and S. Witkowski (MPQ).

The Conference has been mainly characterized by the high scientific level of the presented papers. Experimental results have shown values of 20 to 40 $g.cm^{-3}$ in DT cryogenic spherical targets direct-driven illuminates, that represents the highest ones at present time. Also, recent experiments of indirect-drive give us the availability to perform high power pulse-shaped experiments needed for high density implosions Theoretical developments have permited to extrapolate results obtained up to now with those needed for a high gain laser fusion.

Because the general aim of the Conference was to discuss the way toward high gain laser fusion, several papers were dedicated to explain new ICF facilities that are being planned around the world to obtain the breakeven. So, the DOE (USA) is planning to upgrade the Omega Laser at the University of Rochester, and is performing the prospective studies to build a major 10MJ Laboratory Microfusion Facility (LMF), to be completed within a decade. The USSR is planning for the completion of a multihundred kilojoule facility around 1993, and Japan has established the plans for a major upgrade of their GEKKO-XII facility. The main European groups working in this field have seriously thought in a big experimental facility in the range of similar ignition ICF facilities proposed in other countries.

Besides these developments, there are several proposals for international collaboration on ICF. Academician Basov from the Lebedev Institute and Professor Yamanaka of Osaka University have suggested that the time is right for international collaboration in ICF, and have put forth proposals for consideration by the UNESCO, IAEA, and other international institutions.

In addition to papers presenting the technical and scientific data justifying the good perspectives to obtain near breakeven and future high gain ICF, a statement-Inertial Confinement Fusion-The Next Step- which was named the MANIFESTO OF MADRID, was signed by relevant members of ICF laboratories around the world, in which it was urged the international comunity to take action for a possible collaboration among nations in order to provide in the faster way technological benefits from fusion to our societies. Also an International Society for Inertial Fusion Energy was founded.

Due to the remarkable progress in ICF during the last few years, the high scientific level of the Conference and the spirit of this Conference, the editors have decided to publish this Proceedings book to offer the scientific community the progress in this field

Finally, we would like to express our gratitude to the sponsors for their support, to the College of Industrial Engineering of Madrid for using its installation, and to all the professors, assistant researchs and staff members of the DENIM for helping in the organization of the conference and in the preparation of this book.

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J. Manuel Perlado
Editors


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