

PREFACE

TENTH CAROLUS MAGNUS SUMMER SCHOOL ON PLASMA AND FUSION ENERGY PHYSICS

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Training the new ITER generation: This is the most important goal in fusion education. ITER, the international fusion test reactor, is on its way. The contours of its physical appearance are becoming visible: a motivating view for young scientists, attractive because of its extreme technical and scientific challenges and because of the sustainable energy, “green” aspect of it. ITER is also a 35-year worldwide political commitment to the development of fusion power, and as such, a long-term career perspective for potential students. However, to educate these enthusiastic students into fully qualified fusion engineers, options are limited. Only at a few universities dedicated specific courses for fusion PhD students are offered. To fill this gap, the Carolus Magnus Summer School was founded by the partners of the Trilateral Euregio Cluster (TEC): FOM Rijnhuizen (The Netherlands), Forschungszentrum Jülich (Germany), Royal Military Academy (Belgium), and SCK•CEN (Belgium). This is a biennial event, which celebrated this year its tenth edition in Weert, The Netherlands. During two weeks, the 60 participating students experienced an exhaustive, but attractive, program: a broad and rather detailed overview of the whole breadth of the physics and part of the engineering related to magnetically confined fusion.

As the reader will see, the coverage of the school is quite wide, ranging from the basics of magnetic confinement, equilibrium, and instabilities via the theory of plasma-wave interaction and transport to experimental issues as diverse as plasma diagnostics, materials issues, and state-of-the-art results from the leading experimental devices. A special focus is on the topic of plasma-surface interaction, since this is the common expertise and research area of the TEC partners. This lecturing program was combined with visits to Forschungszentrum Jülich (the TEXTOR tokamak) and FOM Rijnhuizen (the MAGNUM-PSI linear device) and an entertaining live demonstration by Prof. G. Kroesen (Eindhoven University of Technology, The Netherlands) of the beauty and peculiarities of exotic plasmas.

Judged by the very positive response of the students and the quality of the papers in this book of proceedings, the lectures succeeded in contributing to this main goal: the education of fusion engineers. It is quite some effort to incorporate the newest developments in the field in a clear and didactic manner in the lectures, but I am very grateful that all lecturers did put so much effort into this, on a voluntary basis, irrespective of their busy jobs. Traditionally, the lectures are given by specialists in their fields. Although many lecturers are recruited from the TEC partners, we have to rely on a number of external experts: L.G. Eriksson (European Commission, Brussels, Belgium), G. van Oost (Ghent University, Belgium), D. Hartmann (IPP, Greifswald, Germany), B. Weyssow (EFDA), P. Helander (IPP, Greifswald, Germany), P. Nuij (Eindhoven University of Technology, The Netherlands), G. Dif-Pradalier (CEA, France), M. Rubel (KTH, Sweden), H. Wilson (York University, United Kingdom), Y. Kiptily (JET, United Kingdom), S. Sharapov (JET, United Kingdom), R. Wolf (IPP, Greifswald, Germany), and S. Lisgo (ITER).

As a chairman, I could make this summer school a success only due to the aforementioned efforts of the lecturers, but certainly also due to the help of my co-organizers: Greg de Temmermann, Dirk van Eester, Ernesto Lerche, Arkadi Kreter, Michael Lehn, and Inge Uytendouw. Finally, we also benefited from contribution of the sponsors FOM, Stichting Physica, and FUSENET. Many thanks to all who made this summer school possible!

The setting of the summer school in a holiday resort was such to promote the interaction and networking possibilities with fellow students, but also with the lecturers. Having run this show, I was quite amazed by the spirit and enthusiasm of this young generation: dedicated to their work (attending all the lectures), smart (many intriguing questions), and motivated to solve one of the main societal challenges (the energy problem), but also open in communicating and interacting with each other. Although there was a large diversity of backgrounds on the educational level (ranging from masters to PhDs to postdocs to engineers), on the cultural level (23 different nationalities), and of research subjects, there was sufficient overlap to find common discussion points and to benefit from each others' experience. With these young, bright minds entering the field, the future looks much more sunny!