PREFACE

FOURTH CAROLUS MAGNUS SUMMER SCHOOL ON PLASMA PHYSICS

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The Carolus Magnus Summer School is named after the well-known emperor who was crowned in Rome in the year 800. He restored civilization and introduced schools in most of Western Europe about 400 years after the fall of the Roman Empire. The Carolus Magnus Summer School is organized biennially and took place previously in Vaals, The Netherlands (1993); Aachen, Germany (1995); and Spa, Belgium (1997)—all places a short distance from the center of Carolus Magnus' empire, Aachen. The logo of the Carolus Magnus Summer School depicts the silhouette of a statue of the emperor, which is kept in the Musee de Louvre, in Paris, with the background being the area of the three organizing countries: Belgium, The Netherlands, and the German land of North-Rhine Westfalia in the background.

The First Carolus Magnus Summer School in 1993 was the initial sign of a concerted move toward an integrated collaboration between the three plasma physics research institutes that, since 1995, have been officially grouped into the Trilateral Euregio Cluster (TEC). Although there already had been several summer schools organized by other European institutes, the programs of these schools were either very broad (covering also low-temperature plasma physics, plasma-astrophysics, etc.), or they were targeted mainly to undergraduate students. The main aim behind the organization of the Carolus Magnus Summer School has been to give PhD and postdoctoral students of the three organizing institutes a thorough, in-depth course in high-temperature plasma physics for magnetic confinement fusion, with emphasis on the tokamak line. Even though the prime focus of the first school was the education of our own students, it was considered pertinent to open the school also to students from outside the Euregio. Approximately 50% of the participants of the first school came from outside the organizing countries. The number of TEC students slowly dropped over the years to a percentage of approximately 25% at the third and fourth schools. At the same time, the school has obtained a more international character, with attendees from all over the world. The Fourth Carolus Magnus Summer School on Plasma Physics took place in Castle Vaeshartelt, situated about 7 km north of the city of Maastricht and was attended by 42 students form 16 different countries.

A very important ingredient of the Carolus Magnus Summer School is the continuous effort to improve the scientific program, taking account of remarks and suggestions made by lecturers and former students. Especially for this reason, we are very satisfied that the proceedings are printed biennially as a special issue of *Transactions of Fusion Technology*. In this way, the lecturers are able to significantly update and improve their lecture notes from school to school. Moreover, it gives the organizers the ability to change topics rather easily. About one-third of the lectures at the Fourth Carolus Magnus Summer School is fully new with respect to the third school. This can be attributed to the fact that either the lectures are dedicated to new topics or that new lecturers have replaced former ones; although they may be presenting similar topics, they usually do so from another point of view, resulting in different lectures. The organizing committee is very pleased with the fact that the proceedings of the Carolus Magnus Summer Schools are used as textbooks or books of reference for courses given at various European and American universities.

After having been involved in the organization of all Carolus Magnus Summer Schools hitherto, I must certainly say a word of thanks to the lecturers that gave *acte de présence* at the school. Their continuous effort to try to present the material as didactically as possible and their compliance with the desires formulated by every new organizing committee are highly appreciated.

Although we are trying to make the school as relaxed as possible, there seems to be a kind of lower limit to the number of lectures, which is approximately 50 to 55 lectures hours (excluding the special lectures in the evening and the poster sessions). Because the majority of the students actively attend the lectures during a period of 2 weeks, they are to be admired for their endurance and motivation. A very important side aspect of the Carolus Magnus Summer School is the networking between the students. Taking for granted that the present generation of students will be the fusion researchers of tomorrow, it is good to realize that during the summer schools, very often lifelong friendships emerge (of course, we know this because of scaling laws). Many students of the first three schools—many of whom are still working in fusion—continue to have very regular contacts with each other.

Also, I would like to devote a special word of thanks to the various sponsors, who are listed on a separate page. Without their financial support, it would be almost impossible to organize the Carolus Magnus Summer School. We do hope that they continue to support forthcoming schools and realize the fact that the "Holy Grail" of magnetic confinement fusion is within reach. We should not miss the change of pursuing this noble and challenging goal, aiming for the first working fusion reactors before the inevitable energy crisis of the 21st century sets in.

Finally, I would like to thank the following guest lecturers from outside the three organizing institutes and collaborating universities who have brought the quality of the school to an even higher level: H. Bruhns from the European Community Fusion Programme, Brussels; H. Maassberg, D. Hartmann, and K. Lackner from the Max-Planck-Institut für Plasmaphysik, Garching; and I. Hoffmann from the Gesellschaft für Schwerionenforschung, Darmstadt. We are especially indebted to Hoffman because of the very small amount of time between our invitation and his actual lecture.

Last but not least, I personally would like to thank *all* of my co-organizers: André, Dirk, and Egbert, from the Fourth Carolus Magnus Summer School, and Luc, Raymond, Henning, and Guido, from the first three schools. I greatly enjoyed my collaboration with all of you. It was an enormous pleasure for me to continually work on further improvement of the quality of the school. It is then also with mixed feelings that I say farewell to the summer school. Although I am certainly confident that I would enjoy being on the organizing committee for a fifth, sixth, . . . time, I think it is wise to step down and make a place for a new person, one with new ideas and insights. I wish all the best to the organizing committee of the Fifth Carolus Magnus Summer School, which will convene in the second and third weeks of September 2001 in Bad Honneff, Germany.