



«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE
TO PAY A PERMANENT TRIBUTE TO ARCHIMEDES AND GALILEO GALILEI, FOUNDERS OF MODERN SCIENCE
AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES



INTERNATIONAL SCHOOL OF FUSION REACTOR TECHNOLOGY

16th Course

DIAGNOSTICS AND TECHNOLOGY DEVELOPMENTS IN VIEW OF ITER AND DEMO

ERICE–SICILY: 28 APRIL – 4 MAY 2017

Sponsored by the: • Italian Ministry of University and Research • Sicilian Regional Government

TOPICS AND LECTURERS

Historical diagnostics developments in view of ITER and DEMO

- T. DONNÉ, EUROFUSION, Garching, DE

Tokamak Fusion reactor and DEMO diagnostics

- W. BIEL, Institute of Energy and Climate Research (IEK-4), Juelich, DE

Interfero-polarimetry diagnostics developments for ITER

- F. ORSITTO, ENEA, Frascati, IT

Diagnostics developments in JET for the DT campaign and potential application for ITER and DEMO

- A. MURARI, Consorzio RFX, Padova, IT

Diagnostics developments in stellarators and potential interest and application for ITER and DEMO

- A. DINKLAGE, Max-Planck-Institut für Plasmaphysik in Greifswald, DE

Neutron and gamma diagnostics developments for ITER and DEMO

- M. CECCONELLO, Uppsala University, SE

Plasma shape reconstruction and control for ITER and DEMO

- G. DE TOMMASI, Napoli University, IT

Diagnostics developments in inertial fusion

- D. BATANI, Université de Bordeaux, FR

Core CXRS diagnostics for ITER

- P. MERTENS, Institute of Energy and Climate Research, Juelich, DE

Spectroscopy measurements in ITER and DEMO

- R. BARNŚLEY, ITER, St. Paul,

Overview of the advancements in plasma control supervision

- K. MEYER, Cosylab ITER, SL

Tomographic inversion techniques used for ITER

- J. MLYNAR, Czech Technical University Prague, CZ

Overview of diagnostics developments for ITER

- M. WALSH, ITER, St. Paul, FR

Microwaves diagnostic for density and temperature profile and fluctuation measurements

- R. SABOT, CEA, Cadarache, FR

Innovant tomography diagnostic for WEST and associated optics for application to ITER or DEMO

- D. MAZON, CEA, Cadarache, FR

Fusion neutrons - impact on materials and diagnostic systems

- M. RUBEL, KTH University, Stockholm, SE

Energetic particle diagnostics in present tokamaks and challenges towards a burning plasma

- M. NOCENTE, Milano Bicocca University, IT

PURPOSE OF THE COURSE

The present way of life, unbridled population growth of the emergent countries and ineluctable scarcity of primary fuel will drive in some decades to an unavoidable catastrophic scenario in relation to the worldwide problems of energy production.

Thermonuclear fusion appears to be a credible and lasting solution to this problem. Considerable efforts are nowadays devoted to attaining working fusion reactors. Among the main advantages of fusion, let us name the almost limitless character of fuel, the absence of greenhouse gas emission and the reduced radioactive waste.

Diagnostic developments for a tokamak Demonstration fusion reactor (DEMO) and for the International Thermonuclear Experimental Reactor (ITER) face unprecedented challenges. In fact those machines will operate with tritium for fueling the reaction and this will induce high temperature, high energetic neutron flux and intense gamma radiation. The main consequence is that most of the present diagnostics systems installed in actual machines needs to be reconsidered and modified for being adapted to ITER or DEMO.

The Course will cover areas of interest to the magnetic fusion confinement (tokamak, stellarators), Inertial Confinement Fusionlaser, and plasma physics scientific communities with particular care towards measurement applications and associated Physics in view of ITER and DEMO. It is opened in particular to students and researchers wishing to enter this new field. Lectures will cover current developments in theory and experiments but are also intended to give the basics of the field.

Poster sessions allowing participants to show their work are planned.

APPLICATIONS

Persons wishing to attend the Course should apply in writing to:

- Professor Didier MAZON
CEA Cadarache IRFM/STEP/GPAS 1
3108 St Paul Lez Durance Cedex, France
Tel 0033.44.2254853 - Fax 0033.44.2256222
E-mail: Didier.Mazon@cea.fr

- PLEASE NOTE

Participants must arrive in Erice on April 28, not later than 5 pm.

POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (750 metres above sea level) more than three thousand years ago. The founder of modern history — i.e. the recording of events in a methodic and chronological sequence as they really happened without reference to mythical causes — the great Thucydides (~500 B.C.), writing about events connected with the conquest of Troy (1183 B.C.) said: «After the fall of Troy some Trojans on their escape from the Achaei arrived in Sicily by boat and as they settled near the border with the Sicilians all together they were named Elymi: their towns were Segesta and Erice.» This inspired Virgil to describe the arrival of the Trojan royal family in Erice and the burial of Anchise, by his son Aeneas, on the coast below Erice. Homer (~1000 B.C.), Theocritus (~300 B.C.), Polybius (~200 B.C.), Virgil (~50 B.C.), Horace (~20 B.C.), and others have celebrated this magnificent spot in Sicily in their poems. During seven centuries (XIII-XIX) the town of Erice was under the leadership of a local oligarchy, whose wisdom assured a long period of cultural development and economic prosperity which in turn gave rise to the many churches, monasteries and private palaces which you see today.

In Erice you can admire the Castle of Venus, the Cyclopean Walls (~800 B.C.) and the Gothic Cathedral (~1300 A.D.). Erice is at present a mixture of ancient and medieval architecture. Other masterpieces of ancient civilization are to be found in the neighbourhood: at Motya (Phoenician), Segesta (Elymian), and Selinunte (Greek). On the Aegadian Islands — theatre of the decisive naval battle of the first Punic War (264-241 B.C.) — suggestive neolithic and paleolithic vestiges are still visible: the grottoes of Favignana, the carvings and murals of Levanzo.

Splendid beaches are to be found at San Vito Lo Capo, Scopello, and Cornino, and a wild and rocky coast around Monte Cofano: all at less than one hour's drive from Erice.

More information about the «Ettore Majorana» Foundation and Centre for Scientific Culture can be found on the WWW at the following address:
<http://www.ccsem.infn.it>