



«ETTORE MAJORANA» FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE  
TO PAY A PERMANENT TRIBUTE TO GALILEO GALILEI, FOUNDER OF MODERN SCIENCE  
AND TO ENRICO FERMI, THE "ITALIAN NAVIGATOR", FATHER OF THE WEAK FORCES  
**THE WORLD YEAR OF PHYSICS 2005**



# INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS

## 43rd Course: TOWARDS NEW MILESTONES IN OUR QUEST TO GO BEYOND THE STANDARD MODEL

**ERICE-SICILY: 29 AUGUST - 7 SEPTEMBER 2005**

- Sponsored by the: • Academies of Sciences of Estonia, Georgia, Lithuania, Russia and Ukraine •  
• Chinese Academy of Sciences • Commission of the European Communities • European Physical Society •  
• Italian Ministry of Education, University and Scientific Research • Sicilian Regional Government •  
• Weizmann Institute of Science • World Federation of Scientists • World Laboratory

### PROGRAMME AND LECTURERS

#### Standard Model and Beyond

- T. APPELQUIST, Yale University, New Haven, CT, USA

#### Latest Results on Lattice QCD

- R.D. MAWHINNEY, Columbia University, New York, NY, USA

#### Experimental Signatures of Strings and Branes

- I. ANTONIADIS, CERN, Geneva, CH

#### Updates on Local Supersymmetry and its Spontaneous Breaking

- S. FERRARA, CERN, Geneva, CH; & Univ. of California, Los Angeles, CA, USA

#### The Longest-lasting Mystery of High-Energy Physics: The Origin of Cosmic Rays

- A. DE RUJULA, CERN, Geneva, CH

#### The Physics of the Black Holes

- G. 't HOOFT, Utrecht University, NL

#### Complexity at the Fundamental Level

- A. ZICHICHI, CERN, Geneva, CH; INFN & University of Bologna, I

#### HIGHLIGHTS FROM

##### BNL: Experimental Status of QCD Glue-Balls

- S.J. LINDENBAUM, The City University of New York, NY, USA

##### SLAC: CP Violation in the B Sector

- M. GIORGI, INFN & University of Pisa, I

##### FERMILAB: Tevatron Physics

- D. DENISOV, Fermilab, Batavia, IL, USA

##### AMS

- S.C.C. TING, MIT, Cambridge, MA, USA

##### CERN: The LHC Supercollider

- L. ROSSI, CERN, Geneva, CH

##### CERN: The CLIC Project for a future $e^+e^-$ linear collider

- F. TECKER, CERN, Geneva, CH

##### FRASCATI: The Never Ending Story: The Nucleon Form Factors

- R. BALDINI, Enrico Fermi Centre, Rome, I

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\* SPECIAL SESSIONS FOR \*  
\* NEW TALENTS AND "E. FERMI" JUNIOR GRANTS \*  
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**Board of Lecturers and Invited Scientists:** In addition to the Lecturers of the School, a group of distinguished physicists is invited to contribute to the lively intellectual atmosphere of the School by participating in the discussions following the Lectures. Lecturers and Invited Scientists moreover will take part in the selection of "New Talents", in the choice of the "Best Student(s)" and in the award of the various scholarships and grants open for competition.

**Special Sessions for New Talents and "E. Fermi" Junior Grants:** One of the aims of the School is to encourage and promote young physicists to achieve recognition at an international level. There will be poster sessions whereby each student has the privilege of presenting the results of current studies and interacting with other participants to their mutual benefit.

Each student may also propose a contribution for open presentation. The Board of Lecturers and Invited Scientists will select the best proposals. Priority will be given to new material of either an experimental or theoretical nature, especially if the candidate has made an important contribution to the results to be presented. A review paper has lower priority and, as before, will only be selected if the candidate can point out some new features in the field reviewed. Due to the large number of students and the limited time available, it is obvious that only selected "New Talents" can be given the possibility of making themselves known. The selection will be based solely on "scientific excellence", without favour to geographical distribution, the laboratory or the university of origin.

On the occasion of the World Year of Physics 2005 and to honour the memory of Enrico Fermi, ten "E. Fermi" Junior Grants have been established by the "ENRICO FERMI" CENTRE (Rome). The ten grants will be awarded to "New Talents", of whom seven from developing countries. These are one-year grants that will be made available to the selected grantees in their country of origin.

#### PURPOSE OF THE SCHOOL

Phenomenological and theoretical developments in Gauge Theories, as well as in global and local Supersymmetry and in all the other sectors of Subnuclear Physics, will be the centre of this year's Course where the experimental highlights from the most relevant sources of new data will be presented and discussed. An original feature of the School is the **Special Sessions for New Talents and "E. Fermi" Junior Grants**, a selected number of whose contributions will be published in the proceedings. As it is in the tradition of this School — the first and the oldest Subnuclear one in the world — the Discussion Sessions represent the unique occasion for young talents to show their ability in contributing to the development of our understanding of the frontier problems in Subnuclear Physics.

#### DIPLOMAS for Best Students

The following Diplomas have been established in honour of, and named after, the late physicists:

JOHN S. BELL	GUNNAR KÄLLEN	ANDREI D. SAKHAROV
PATRICK M.S. BLACKETT	GIUSEPPE P.S. OCCHIALINI	VICTOR F. WEISSKOPF
CARLO CASTAGNOLI	BRUNO PONTECORVO	EUGENE P. WIGNER
JAMES CHADWICK	ORESTE PICCIONI	BJORN H. WIJK
PAUL A.M. DIRAC	ISIDOR I. RABI	CHIEN SHIUNG WU
VLADIMIR N. GRIBOV	GIULIO RACAH	
ROBERT HOFSTADTER	BRUNO ROSSI	

These Diplomas will be awarded at the end of the Course by the Board composed of the Lecturers and the Invited Scientists.

#### APPLICATIONS

Interested candidates should send a letter to the Director of the School:

Professor Antonino ZICHICHI  
CERN  
CH-1211 GENEVA 23, Switzerland

Needed:

- date of birth and present activity;
- nationality;
- letter of recommendation from a senior physicist.

To honour the memory of Victor Weisskopf, the **WORLD FEDERATION OF SCIENTISTS (WFS)** has established a commemorative fund to support needy students. Students in need of financial support should apply for this fund, specifying their needs (i.e. participation fee only or also travel expenses) at the time of the application to the School.

#### 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 Enea, 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.

#### PLEASE NOTE

Participants must arrive in Erice on August 29, not later than 5 p.m.

More information about the other activities of the  
"ETTORE MAJORANA" FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE  
can be found on the WWW at the following address:  
<http://www.ccsem.infn.it>

G. 't HOOFT AND A. ZICHICHI  
DIRECTORS OF THE COURSE

A. ZICHICHI  
DIRECTOR OF THE SCHOOL