



GALILEO GALILEI FOUNDATION  
WORLD FEDERATION OF SCIENTISTS  
ETTORE MAJORANA FOUNDATION AND CENTRE FOR SCIENTIFIC CULTURE

**GALILEO GALILEI CELEBRATIONS**  
Four Centuries Since the Birth of Modern Science

# INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS

## 36th Course

# FROM THE PLANCK LENGTH TO THE HUBBLE RADIUS

ERICE-SICILY: 29 AUGUST - 7 SEPTEMBER 1999

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 • Italian Ministry of University and Scientific Research • Sicilian Regional Government •  
• Weizmann Institute of Science • World Laboratory

### PROGRAMME AND LECTURERS

#### OPENING LECTURE

*New Adventures in the Search for Unification*  
• E. WITTEN, Institute for Advanced Study, Princeton, USA

#### HOT TOPICS

*Will the SM Survive Till Year 2000?*  
• G.G. ROSS, University of Oxford, UK  
*Maximal CP Violation in Flavour Mixing*  
• H. FRITZSCH, LMU, München, D  
*The Proton-Spin Crisis: another ABJ Anomaly?*  
• G.M. SHORE, University of Wales, Swansea, UK  
*The Problem of Chirality Restoration from Dilepton Production in Heavy Ion Collisions*  
• E.V. SHURYAK, State University of New York, Stony Brook, USA  
*J/ψ Suppression as Evidence for Quark Gluon Matter*  
• D. KHARZEBV, Brookhaven National Lab, Upton, USA  
*Experimental Evidence for Neutrino Oscillations*  
• M. KOSHIBA, University of Tokyo, Kamioka, J  
*Metaquestions at the Ends of the Ladder of Size*  
• S.L. GLASHOW, Harvard University, Cambridge, USA

#### HEP FROM THE QCD TO THE GUT SCALE

*Topological Aspects of QCD*  
• G. 't HOOFT, Rijksuniversiteit Utrecht, Utrecht, NL  
*Flavour Physics*  
• R. BARBIERI, Scuola Normale Superiore, Pisa, I  
*Origin and Consequences of Soft SUSY Breaking*  
• G. GIUDICE, CERN, Geneva, CH  
*Old and New Approaches to non-Perturbative Gauge Dynamics*  
• E. RABINOVICI, The Hebrew University, Jerusalem, Israel  
*Recent Results from Lattice-QCD*  
• R. KENWAY, University of Edinburgh, UK

#### GRAVITY AND COSMOLOGY: TOWARDS THE HUBBLE RADIUS

*Black Holes and Branes in String Theory*  
• K. SKENDERIS, Leuven University, Leuven, B  
*Are there Alternatives to Standard Inflation?*  
*Status of Inflation*  
• A.H. GUTH, MIT, Cambridge, USA  
*Initial Conditions for Inflation*  
• N. TUROK, University of Cambridge, UK  
*Pre-Big Bang Cosmology and the Beginning of the Time Myth*  
• G. VENEZIANO, CERN, Geneva, CH

**Sessions for New Talents:** 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. These Special Sessions will be chaired by Peter Higgs.

**Invited Scientists:** A group of distinguished physicists has been invited to contribute to the lively intellectual atmosphere of the School by participating in the discussions following the Lectures. Moreover they will take part in the selection of the "New Talents", in the choice of the Best Student and in the award of the various scholarships open for competition.

#### PURPOSE OF THE SCHOOL

*Purpose of this year's School is to focus attention on the basic unity of fundamental physics both at the theoretical and at the experimental level. Experiments at the highest energies or at the largest attainable distances in the Cosmos can shed important complementary information on Physics at the Subnuclear level. Participants are reminded that the discussions are the greatest attraction of the School.*

*Special Sessions for New Talents. A series of special sessions will be devoted to young physicists who can present original pieces of work, or review lectures on topics that they consider particularly interesting. Selection will be made on the basis of the proposed topic of presentation and the recommendation*

#### APPLICATIONS

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

Professor Antonio ZICHICHI  
CERN  
CH-1211 GENEVA 23, Switzerland

#### specifying:

- i) date of birth and present activity;
- ii) nationality.

Please enclose a letter of recommendation from the group leader or the Director of the Institute or from a senior physicist.

#### 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 Centre can be found on the WWW at the following address:  
<http://www.ecsm.infn.it>

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

A. ZICHICHI  
DIRECTOR OF THE SCHOOL

• **THE GLORIOUS DAYS OF PHYSICS** •  
• *The Renormalizability of Spontaneously Broken Gauge Interactions* •  
• G. 't HOOFT, Rijksuniversiteit Utrecht, Utrecht, NL •

#### REPORTS FROM

**LEP**  
• U.F. BECKER, MIT, Cambridge, USA

**HERA**  
• A. WAGNER, DESY, Hamburg, D

**FERMILAB**  
• J. PEOPLES, FNAL, Batavia, USA

**GRAN SASSO**  
• A. BETTINI, Gran Sasso Lab INFN, Assergi, I

**AMS**  
• S.C.C. TING, MIT, Cambridge, USA

#### FUTURE

*The Tevatron Upgrade*  
• J. PEOPLES, FNAL, Batavia, USA

**LHC**  
• L. MAIANI, INFN & University, Rome, I

*The TESLA Project*  
• B.H. WILK, DESY, Hamburg, D

*The ELN Project*  
• A. ZICHICHI, INFN & University, Bologna, I, and CERN, Geneva, CH

#### SPECIAL SESSIONS FOR NEW TALENTS

#### CLOSING LECTURE

*From Gauge Fields to Solitons and back again*  
• L.D. FADDEEV, V.A. Steklov Math. Institut, St. Petersburg, RU

#### POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (730 metres above sea level) more than three thousand years ago. The founder of modern history — i.e. the recording of events in a synthetic 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 capture of Troy some Trojans on their escape from the Achaean arrived in Sicily by boat and as they sailed 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 earned 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 Venere, 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: in Motya (Phoenician), Segesta (Elymian), and Selinunte (Greek). On the Aegean Islands — the site of the decisive naval battle of the First Punic War (264-241 B.C.) — rugged mountains and paradisiacal villages are still visible: the groves of Favignana, the carvings and murals of Levanzo.

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

#### SCHOLARSHIPS

The following scholarships have been established in honour of, and named after, the late physicist:

JOHN S. BELL	ROBERT HOFSTADTER	GIULIO RACAH
PATRICK M.S. BLACKETT	GÜNTER KÄLLÉN	BRUNO ROSSI
JAMES CHADWICK	ANDRÉ LAGARRIGUE	ANDRÉ D. SAKHAROV
JACQUES DUBOUCHÉ	GIUSEPPE P.S. OCCHIALINI	ISUJI SAKURAI
PAUL A.M. DIRAC	BRUNO PONTECORVO	EMMELE P. WIGNER
VLADIMIR N. GRIBOV	ISIDOR I. RABI	CHIEHI SHIBUSAWA

The scholarships cover registration fees and full board and lodging in Erice. In order to allow a more direct judgement of all applicants these scholarships will be awarded at the end of the Course by a Committee composed of the Lecturers and the Invited Scientists.