



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

## 35th Course

# HIGHLIGHTS: 50 YEARS LATER

ERICE-SICILY: 26 AUGUST - 4 SEPTEMBER 1997

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 •  
• Welzmann Institute of Science • World Laboratory

### PROGRAMME AND LECTURERS

#### OPENING LECTURE

*The Limits of our Imagination in Elementary Particle Theory*  
• G. 't HOOFT, Universiteit Utrecht, Utrecht, NL

#### SPECIAL SESSIONS FOR NEW TALENTS

#### THEORY AND PHENOMENOLOGY

*Some Puzzles in Particle Physics*  
• S.L. GLASHOW, Harvard University, Cambridge, MA, USA

*Beyond the Standard Model*  
• F. WILCZEK, Institute for Advanced Study, Princeton, NJ, USA

*Superstring Theory, M-theory and beyond*  
• M.B. GREEN, University of Cambridge, UK

*Status of Inflation*  
• A. LINDE, Stanford University, Stanford, CA, USA

*Pre-Big Bang Physics*  
• G. VENEZIANO, CERN, Geneva, CH

*Status of the One Parameter No-scale Supergravity Model*  
• D. NANOPOULOS, Texas A&M University, TX, USA

*Why FCNC are not there in spite of SUSY*  
• A. MASIERO, SISSA, Trieste, I

*Gauge Mediated SUSY Breaking*  
• S. DIMOPOULOS, CERN, Geneva, CH

*Polarized DIS: Status*  
• G. ALTARELLI, CERN, Geneva, CH, Rome University III, Rome, I

**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.

\*\*\*\*\*  
• **THE GLORIOUS DAYS OF PHYSICS**  
• 40 Years of Parity Non-Conservation in memory of Chien Shiang Wu •  
• T.D. LEE, Columbia University, New York, NY, USA  
\*\*\*\*\*

**HINTS FOR NEW PHYSICS**  
*J/ψ Suppression and Colour Deconfinement in Heavy Nuclei Collisions*  
• H. SATZ, University of Bielefeld, D  
*Anomalous Events at high x and Q<sup>2</sup> in (ep) DIS*  
• G. WOLF, DESY, Hamburg, D  
*High p<sub>T</sub> Lepton and Photon Events with large E in (pp̄)*  
• G. KANE, University of Michigan, Ann Arbor, MI, USA  
*Search for New Physics in (e<sup>+</sup>e<sup>-</sup>) at LEP*  
• S. KATSANEVAS, CERN, Geneva, CH  
*Neutrino Anomalies in SUPERKAMIOKANDE*  
• Y. TOTSUKA, University of Tokyo, Kamioka, J

**STATUS OF THE STANDARD MODEL**  
*Final High Precision Electroweak Data*  
• M. PEPE-ALTARELLI, LNF, Frascati, I

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

**CLOSING LECTURE**  
• T.D. LEE, Columbia University, New York, NY, USA

#### PURPOSE OF THE SCHOOL

Subnuclear Physics was born fifty years ago, when three great discoveries were announced: 1) the first example of radiative effects (Lamb-shift); 2) the first example of a (qq̄) system (π-meson); 3) the first example of a new flavour beyond the first family (V-particles).

Fifty years later, we have "hints" which could hopefully lead us to: 1) the first evidence for quark-gluon plasma (J/ψ suppression in heavy-ion collisions might well be the precursor); 2) possible supersymmetric signals in (pp̄) and (e<sup>+</sup>e<sup>-</sup>) annihilation (leptonic and photonic final states with high p<sub>T</sub> and large E); 3) anomalous (ep) interactions (high x and high Q<sup>2</sup> DIS); 4) flavour mixing in neutrino physics. The fact that there are "hints" for new physics does not mean that "new physics" is really there, but if there were no "hints" at all, the probability to stop the crisis that Subnuclear Physics has of late been undergoing would be non-existent. The SSC has been cancelled, without serious protest by the thousands of physicists engaged, the world over, in this unique endeavour at the frontier of human knowledge, while the LHC has difficulties of its own. We all realise that we must arouse the public's interest and gain its support. Everybody has heard of the Big-Bang, whereas the Standard Model, that great synthesis of all rigorously measured and reproducible phenomena, resulting from 400 years of science since science began with Galileo Galilei, is hardly known to the general public.

The purpose of this year's school is to review all possible Highlights in experimental observation as well as in theoretical speculation, keeping in mind that we must try and use existing facilities as much as possible, since the new ones will produce physics in the next decade. 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 by a distinguished physicist.

#### APPLICATIONS

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

Professor Antonino 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.

G. ALTARELLI, G. VENEZIANO AND A. ZICHICHI  
DIRECTORS OF THE COURSE

#### POETIC TOUCH

According to legend, Erice, son of Venus and Neptune, founded a small town on top of a mountain (775 metres above sea level) more than three thousand years ago. The great historian Thucydides (~500 B.C.) said that the Elymi - founders of Erice - were survivors of the destruction of Troy. Ancient historians agreed that Erice was the oldest city in Europe.

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. In Erice you can admire the Castle of Venus, the Cyclopean Walls (~800 B.C.) and the Gothic Cathedral (~1300 A.D.). Erice is 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 Aegean 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 Lestriges.

Splendid beaches are at San Vito Lo Capo, Scopello, and Corino, and a wild and rocky coast around Monte Cofano: 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 physicists:

JOHN S. BELL	ROBERT HOFSTADTER	ISIDOR I. RABI
PATRICK M.S. BLACKETT	GUNNAR KÄLLÉN	GIULIO RACAH
JAMES CHADWICK	ANDRÉ LAGARRIGUE	BRUNO ROSSI
AMOS DE SHALIT	GIUSEPPE P.S. OCCHIALINI	ANDREU D. SAKHAROV
PAUL A.M. DIRAC	BRUNO PONTECORVO	JUN J. SAKURAI

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.

#### PLEASE NOTE

Participants must arrive in Erice on August 26, 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.cesem.inf.nu.it>

A. ZICHICHI  
DIRECTOR OF THE SCHOOL