«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 STATISTICAL PHYSICS

15th Course: *NEW TRENDS IN NONEQUILIBRIUM STATISTICAL MECHANICS: CLASSICAL AND QUANTUM SYSTEMS*

ERICE-SICILY: 25 – 31 JULY 2018

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

PROGRAMME AND LECTURERS

Quantum First Detection Problem
• E. BARKAI, Bar-Ilan University, Ramat-Gan, IL

Majorana States in Hybrid 2D Josephson Junctions
• A. BRAGGIO, NEST-Scuola Normale Superiore Pisa, Pisa, IT

Quantum Measurement Cooling
• M. CAMPISI, University of Firenze, Firenze, IT

Uhlmann Curvature in Dissipative Phase Transitions
• A. CAROLLO, University of Palermo, Palermo, IT

Collision Models in Quantum Thermodynamics
• F. CICCARELLO, University of Palermo, Palermo, IT

Probing Ultrastrong Coupling by Population Transfer
• G. FALCI, University of Catania, Catania, IT

Dynamical Transitions, Universality, and Chaos in Prethermal States
• A. GAMBASSI, SISSA, Trieste, IT

Soliton-based Coherent Caloritronics in Long Josephson Junctions
• C. GUARCELLO, NEST-Scuola Normale Superiore Pisa, Pisa, IT

Coupled transport phenomena in chains of oscillators
• S. IUBINI, University of Padova, Padova, IT

Speed Limits in Classical and Quantum Lattice Models
• M. KASTNER, National Institute for Theoretical Physics, Stellenbosch, ZA

Switching Quantum Materials Properties with Light
• A. LANZARA, University of California, Berkeley, CA, US

Heat Transport in Low Dimensions
• R. LIVI, University of Firenze, Firenze, IT

The Driven Spin-Boson Dynamics
• L. MAGAZZU', Regensburg University, Regensburg, DE

The Power Spectrum for Fractional Brownian Motion
• V. MARINARI, Sapienza Università di Roma, Roma, IT

Orthogonality Catastrophe from dissipative impurities?
• J. MARINO, Harvard University, Cambridge, MA, US

Anomalous Diffusion in Membranes and Cytoplasm of Biological Cells
• R. METZLER, University of Potsdam, Potsdam, DE

Irreversible Entropy Production in Nonequilibrium Quantum Processes
• M. PATERNOSTRO, Queen's University, Belfast, UK

1/f Noise in Short Ballistic Graphene Josephson Junctions
• E. PALADINO, University of Catania, Catania, IT

Superconducting Qubits as Quantum Refrigerators and Heat Switches
• J. PEKOLA, Aalto University, Aalto, FI

One Dimensional Phase Ordering with Long-Range Interactions
• P. POLITI, Institute for Complex Systems-CNR, Firenze, IT

Q-stat Thermodynamics: A New Perspective on Nonequilibrium Phenomena
• F. RITORT, University of Barcelona, Barcelona, ES

How Environmental Fluctuations affect the Population Behavior?
• M. RUBI, University of Barcelona, Barcelona, ES

Statistical Physics of the Kuramoto Model
• S. RUFFO, SISSA, Trieste, IT

Modelling Diffusive Memristors
• S. SAVELIEV, Loughborough University, Loughborough, UK

Stochastic Thermodynamics: From Principles to the Cost of Precision
• U. SEIFERT, Universität Stuttgart, Stuttgart, DE

Quantum Many-Body Kapitza Phases of Periodically Driven Spin Systems
• A. SILVA, SISSA, Trieste, IT

Quantum Quench Dynamics in Topological Systems
• S. VISHVESHWARA, University of Illinois at Urbana-Champaign, IL, US

PURPOSE OF THE COURSE

The nonlinear relaxation process in many condensed matter systems proceeds through metastable states, giving rise to long-lived states. Stochastic many-body systems, classical and quantum, often display a complex and slow relaxation towards a stationary state. A common phenomenon in the dynamics of out of equilibrium systems is the *metastability*, and the problem of the lifetime of metastable states involves fundamental aspects of *nonequilibrium* statistical mechanics. In spite of such ubiquity, the microscopic understanding of metastability and related out of equilibrium dynamics still raise fundamental questions. The aim of this meeting is to bring together scientists interested in the challenging problems connected with dynamics of out of equilibrium classical and quantum physical systems from both theoretical and experimental point of view, within an *interdisciplinary* context. Specifically, three main areas of out- of-equilibrium statistical mechanics will be covered: *long range interactions* and *multistability*, *anomalous diffusion*, and *quantum systems*. Moreover, the conference will be a discussion forum to promote new ideas in this fertile research field, and in particular new trends such as *quantum thermodynamics* and novel types of *quantum phase transitions* occurring in *non-equilibrium steady states*, and *topological phase transitions*.

APPLICATIONS

Persons wishing to attend this Course should apply via e-mail to:
Professor Bernardo Spagnolo – University of Palermo & INFN Catania, IT
E-mail: *bernardo.spagnolo@unipa*

PLEASE NOTE

Participants must arrive in Erice on July 25, no later than 7 p.m.

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 Sicanians 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.

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

A.A. DUBKOV – B. SPAGNOLO – D. VALENTI
DIRECTORS OF THE COURSE

P. HÄNGGI – F. MARCHESONI
DIRECTORS OF THE SCHOOL

A. ZICHICHI
PRESIDENT EMFCSC