Technical Programme

SPIE

Fluctuations and Noise

20-24 May 2007 La Pietra Conference Centre • Florence, Italy

The 4th International Symposium

Symposium Chairs:
M. Suhail Zubairy, Texas A&M Univ. (USA)
Derek Abbott, The Univ. of Adelaide (Australia)

Conferences on:

Noise and Fluctuations in Photonics, Quantum Optics, and Communications

Noise and Fluctuations in Circuits, Devices, and Materials

Noise and Stochastics in Complex Systems and Finance

Noise and Fluctuation in Biological, Biophysical, and Biomedical Systems

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SPIE would like to express its deepest appreciation to the symposium chairs, conference chairs, program committees, and session chairs who have so generously given of their time and advice to make this symposium possible. The symposium, like our other conferences and activities, would not be possible without the dedicated contribution of our participants and members.

Welcome!

We are proud to welcome you to SPIE's Fourth International Symposium on Fluctuations and Noise. With 4 parallel conferences covering all aspects of noise-related research, the Symposium organizers have sought to reflect the truly interdisciplinary nature of this emerging and dynamic field.

This year the SPIE Fluctuations and Noise Symposium features nearly 300 presentations from around the globe. The increasing importance of this Symposium as a forum serving the exchange of ideas and interaction among colleagues is a reflection of the growing stature of noise research in the physical and life sciences-and of your hard work and continuing participation.

We welcome you to Florence for this year's event!

Symposium Chairs:

M. Suhail Zubairy,
Texas A&M Univ.
(USA)

Derek Abbott,
The Univ. of Adelaide
(Australia)

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	Conf. 6600 **Noise and Fluctuations in Circuits, Devices, and Materials, *(Macucci),*** *p.9-12*			
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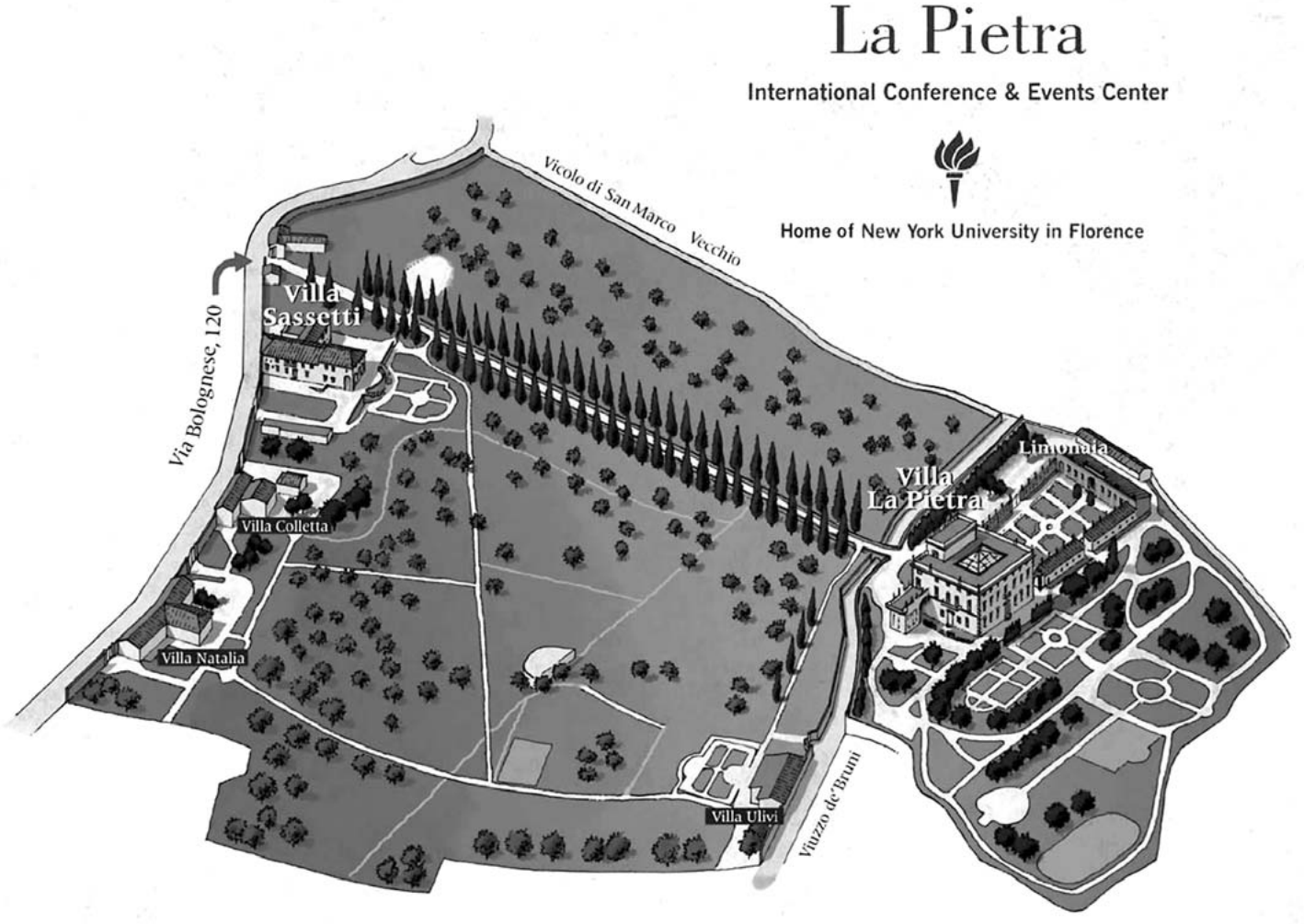
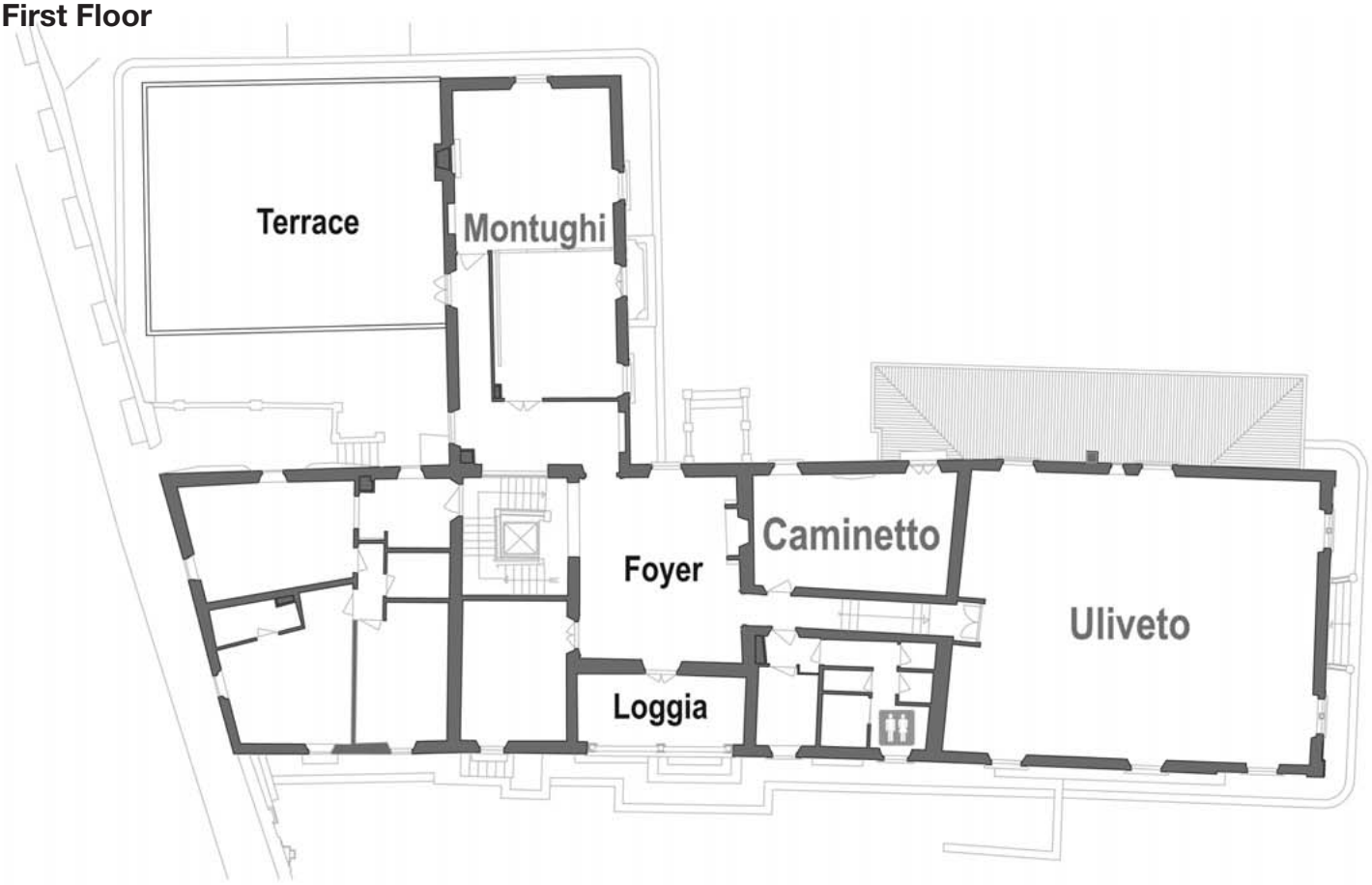
La Pietra

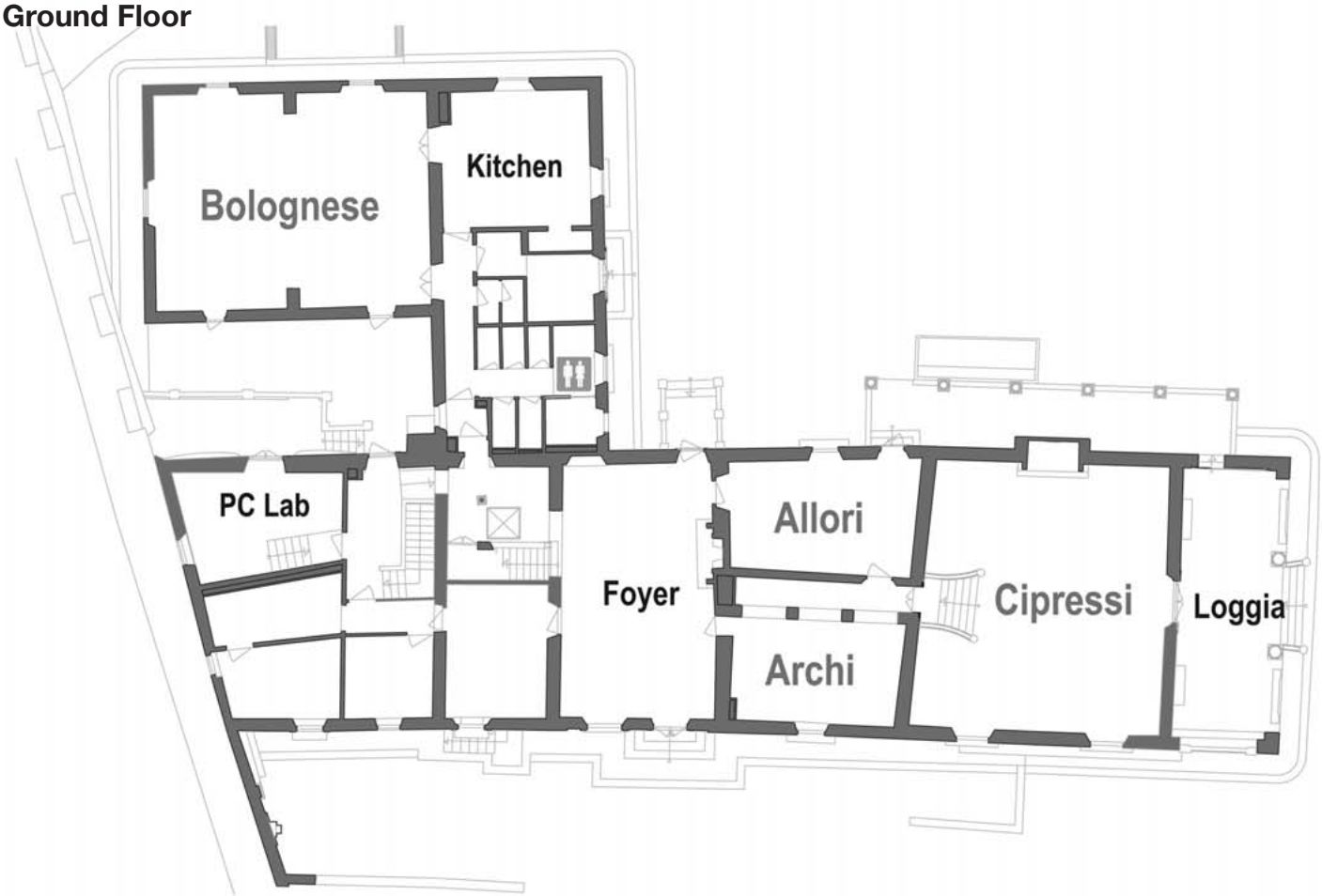
Nestled in the hills surrounding Florence, Villa la Pietra is one of the most spectacular villas in Tuscany. Steeped in the history of Italy at the height of the Renaissance, La Pietra offers you a unique venue to address the most important issues and developments in noise research.



First Floor



Ground Floor



Welcome Reception

La Pietra International Conference and Events Centre

Location: Villa La Sasetti Lawn

Sunday, 20 May . . . . . 18.00 to 20.00 hrs

All conference attendees are invited to attend the welcome reception to meet and renew relationships with colleagues. Please complete your registration prior to the reception and remember to wear your name badge.

Debate Session

Cipressi Room

Tuesday 22 May . . . . . 18.15 to 19.45

Chair: **Derek Abbott,** The Univ. of Adelaide (Australia)

Stochastic Resonance—Trivial or Not?

Join us for a lively debate. Two teams holding opposing views will debate the topic.

Negative (Con Team) Proposition:
Derek Abbott, The Univ. of Adelaide (Australia) and others
"Stochastic resonance is trivial, is as old as Debye, and has no applications."

Positive (Pro Team) Proposition:
Peter Hänggi, Univ. Augsburg (Germany) and others
"Stochastic resonance is significant, is as new as Benzi, and has applications/potential."

Disclaimer: The views expressed by the panelists are for the purpose of lively debate and do not necessarily represent their actual views.

Banquet

Limonaia Room

Tuesday 22 May . . . . . 20.00 to 21.30

The History of Noise: The Scandals

Banquet Presenter: **Leon Cohen,** Hunter College/CUNY (USA)

Note: Banquet space is limited. Please check at registration for availability.

Plenary Sessions

Monday 21 May

08.20 to 10.00 • Limonaia Room

08.20

Welcoming Remarks

M. Suhail Zubairy, Texas A&M Univ.

08.30

Answering open questions in the Bose-Einstein condensation of ideal and interacting Bose gases via a hybrid mixture of laser and statistical physics [6603-500]

Marlan O. Scully, Texas A&M Univ. and Princeton Univ. (USA)

Abstract: Fluctuations in the Bose-Einstein condensate (BEC) remain a rich field of study even in the ideal gas limit. We here present the laser master equation approach to the problem in the spirit of Eugene P. Wigner who said: "With classical thermodynamics, one can calculate almost everything crudely; with kinetic theory, one can calculate fewer things, but more accurately; and with statistical mechanics, one can calculate almost nothing exactly."

The combination of kinetic theory plus statistical mechanics proves to be a powerful combination for the calculation of essentially exact BEC equilibrium results.

We present a new method of calculating the distribution function and fluctuations for a Bose-Einstein condensate (BEC) of N interacting atoms. The present formulation combines our previous master equation and canonical ensemble quasiparticle techniques. It is applicable both for ideal and interacting Bogoliubov BEC and yields remarkable accuracy at all temperatures. For the interacting gas of 200 bosons in a box we plot the temperature dependence of the first four central moments of the condensate particle number and compare the results with the ideal gas. For the interacting mesoscopic BEC, as with the ideal gas, we find a smooth transition for the condensate particle number as we pass through the critical temperature.

Biography: Marlan O. Scully presently holds a joint appointment between Texas A&M and Princeton Universities. He has been involved in many aspects of laser science and quantum optics. These include: the first demonstration of lasing without inversion, the first utilization of coherence effects to generate ultraslow light in hot gases, and the use of quantum coherence to detect anthrax and poison gas at a distance. Furthermore Scully's work on quantum coherence and correlation effects has shed new light on the foundations of quantum mechanics and yielded new insights into quantum thermodynamics.

He has been elected to the National Academy of Sciences, the Academia Europa, and the Max Planck Society and has received numerous awards including the Author Schawlow prize of the APS, the Charles H. Townes Award of the OSA, the Quantum Electronics Award of IEEE, the Elliott Cresson Medal of the Franklin Institute, the Adolph E. Lomb Medal of the OSA, a Guggenheim Fellowship, and the Alexander von Humboldt Distinguished Faculty Prize.

09.15

The ever-fluctuating protein [6602-500]

Yossi Klafter, Tel-Aviv Univ. (Israel)

Abstract: Single molecule techniques offer a unique tool for studying the dynamical behaviour of individual molecules and provide the possibility to construct distributions from individual events rather than from a signal stemming from an ensemble of molecules. In biological systems, known for their complexity, these techniques make it possible to gain insights into the spectrum of conformational changes and activities. Protein functionality is known to strongly depend on the fluctuations around equilibrium. We will discuss the time dependent autocorrelation function of the distance between two points on a fluctuating protein, modeled as a fractal, and an enzyme reactivity using a fluctuating protein model which involves a spectrum of enzymatic conformations that interconvert on the time scale of the catalytic activity.

Biography: Professor Klafter has served as a visiting professor at Columbia University, MIT, ETH, University of Freiburg, University of Paris VI and Exxon Research and Engineering. He is on the editorial board of a number of international journals. Professor Klafter has been a Fellow of the American Physical Society since 1993. He is a recipient of the Humboldt Prize in 1996, the Weizmann prize for the Sciences in 1998, the Kolthoff prize in 2003, the Rothschild Prize in 2004 and the prize of the Israel Chemical Society in 2005.

Research interests include: Chemical Physics, Theoretical Condensed Matter, Nonequilibrium Statistical Mechanics, Anomalous Diffusion, Nanofriction, Molecular Motors, Single Molecules

Tuesday 22 May

08.30 to 10.00 • Cipressi Room

08.30

Origins of randomness in statistical and quantum mechanics [6600-500]

Michael Weissman, Univ of Illinois at Urbana-Champaign (USA)

Abstract: There are three major sources of the 'randomness' underlying noise phenomena. These are the random outcomes of quantum 'measurement' processes, the random ensembles of statistical mechanics, and the algorithmic complexity of many dynamical processes. Here I dwell on the possible connections between the first two sources of randomness. It is often held that the empirical irreversibility of quantum measurement arises from statistical mechanics. I present somewhat speculative arguments that in fact the irreversible approach to statistical ensembles may be rooted in an irreversible quantum decoherence process.

Biography: Michael Weissman has worked on fluctuation phenomena since about 1971, with special emphasis on the use of noise as a source of otherwise hard to get information. His main focus has been on use of noise to probe patterns of random-looking order in glassy materials, such as spinglasses, relaxor ferroelectrics, randomly pinned charge-density-waves and spin-density waves, and magnetic vortex states in superconductors. In addition, he has used noise probes of domain structures in ferromagnets and antiferromagnets. He has developed several new techniques for using non-Gaussian statistical properties of noise to directly test models of glasses and models of driven dynamics, i.e. Barkhausen noise. He has played a role in developing the connections between 1/f noise and somewhat better understood phenomena in condensed matter, as well as in critically examining various proposed descriptions of 1/f noise. In recent years he has taken an interest in the old unresolved issues of the nature of quantum 'measurement' processes and the origins of irreversibility.

Weissman was educated in public school in Missouri in the U.S. He received an undergraduate degree in mathematics from Harvard in 1970, and a PhD in physics from the University of California at San Diego in 1976. His thesis advisor was George Feher, who got him started on the project of developing fluctuation spectroscopy. He did postdoctoral work in chemistry, primarily on quasi-elastic light scattering, with Ben Ware at Harvard, before joining the Physics Department at Illinois in 1978. He is a Fellow of the American Physical Society.

09.15

Quantum physics and number theory [6603-501]

Wolfgang Schleich, Institute of Quantum Physics, Univ. Ulm (Germany)

Abstract: Factorization of numbers using a quantum computer, security of codes due to the use of single photons and the similarity of the statistics of the energy levels of a billiard and the zeros of the Riemann zeta function point to an intimate connection between quantum mechanics and number theory. We illustrate this connection using two examples: i) The factorization of numbers using Gauss sums. In particular we report on a NMR experiment using this technique which has factored a six digits number. ii) The connection between the Riemann-Siegel formula describing the asymptotic behavior of the Riemann zeta function and Schrödinger cats.

Biography: Prof. Wolfgang P. Schleich enjoys working in the field of theoretical quantum optics with particular emphasis on cross-disciplinary questions. He has obtained his Diploma in physics, his Doctorate and his Habilitation from the Ludwig-Maximilians-Universität München in 1981, 1984 and 1989 respectively. At the moment he is head of the Institute of Quantum Physics at the Universität Ulm and also Adjunct Professor at the University of North Texas in Denton (USA). While at the universities of New Mexico, Albuquerque, of Texas at Austin and the Max-Planck Institut für Quantenphysik, Garching he has collaborated with world leaders in physics such as M.O. Scully, J.A. Wheeler and H. Walther. He has published more than 240 papers on problems of quantum optics, foundations of quantum mechanics and general relativity and is author of the highly acclaimed textbook Quantum Optics in Phase Space. For his work he has received numerous awards and honors and is a member of several academies.

Wednesday 23 May

08.30 to 10.00 • Cipressi Room

08.30

Thermal noise informatics: totally secure communication via a wire, zero-power communication, and thermal noise driven computing [6600-501]

Laszlo Kish, Texas A&M Univ. (USA); Robert Mingesz and Zoltan Gingl, Univ. of Szeged (Hungary)

Abstract: Very recently, it has been shown that thermal noise and its artificial versions (Johnson-like noises) can be utilized as information carrier with peculiar properties therefore it may be proper to call this topic Thermal Noise Informatics. Zero Power Communication, Thermal Noise Driven Computing and Totally Secure Classical Communication are relevant examples. The more studies are executed the more open problems and new interesting aspects emerge.

In this talk, while we will briefly outline the first and the second subjects, we shall focus on the third subject, the secure communication via wire. This way of secure telecommunication utilizes the properties of Johnson(-like) noise and those of a simple Kirchhoff's loop. The main aim of the talk is to clarify the properties of this system. The communicator is unconditionally secure at the conceptual (circuit theoretical) level and this property is (so far) unique in communication systems based on classical physics. The practical communicator is superior to quantum alternatives in all known aspects, except the need of using a wire. The communicator device is inexpensive, robust, maintenance-free and it has a low power consumption. It can be a computer card, similarly to Ethernet cards and the communication can even take place via currently used power lines or phone (wire) lines. The scheme is naturally protected against the man-in-the-middle attack. Even though a practical system is never ideal, the engineering is straightforward to make the practical security greater than idealized quantum security. The first practical realization of the communicator device consists of two computer cards and it is successfully tested beyond the quantum range, up to the range of 200 km. This secure communication method is network-ready and, if time allows, the basic idea of a possible secure network solution (classical telecloning of information) will be shown.

Biography: Laszlo Bela Kish is an interdisciplinary scientist, working in multiple fields related to stochastic noise/fluctuations in physical, biological and technological systems. The most known recent results related to his name are probably the Johnson-noise-Kirchhoff-loop secure communicator, fluctuation-enhanced chemical and bacterial sensing, the noise and dissipation limits of Moore's law of miniaturization and the corresponding discussion about the feasibility of quantum computing. He is the starter and Editor-in-Chief of the journal "Fluctuation and Noise Letters". He started SPIE's international symposium series "Fluctuations and Noise" and chaired the first three symposia (Santa Fe 2003, Canary Island 2004, Austin 2005), and earlier he started the international conference series "Unsolved Problems of Noise" and chaired the first meeting (Hungary 1996). Currently, he is a full professor at Texas A&M University and earlier had been conducting research in several countries including Hungary (Doctoral Degree, Physics, 1984), Sweden, The Netherlands, Japan, England, and West Germany. He was the recipient of: the year 2001 Benzelius Prize of the Royal Society of Science of Sweden, and the Doctor of Science (Physics) title of the Hungarian Academy of Science.

09.15

On the relationship between the Langevin equation and stochasticity of the LMS algorithm

Simon Haykin, McMaster Univ. (Canada)

Abstract: I will first describe the Langevin equation in non-equilibrium thermodynamics. This is then followed by presenting a description of the statistical learning behaviour of the least-mean-square (LMS) algorithm.

These two presentations will then set the stage for establishing the relationship between the two entities, one rooted in thermodynamics and the other rooted in adaptive signal processing. In particular, it will be shown that the stochastic behaviour of the LMS algorithm is the discrete-time version of the Langevin equation.

Biography: Simon Haykin received his BSc (First-class Honours), PhD, and DSc, all in Electrical Engineering from the University of Birmingham, England. He is the author of numerous books, including the most widely used books: Communication Systems (4th edition, Wiley), Adaptive Filter Theory (4th edition, Prentice-Hall), Neural Networks: A Comprehensive Foundation (2nd edition, Prentice-Hall) and the newly published book on Adaptive Radar Signal Processing (Wiley), as well as numerous refereed journal papers. He is a Fellow of the Royal Society of Canada, recipient of the Honourary Degree of Doctor of Technical Sciences from ETH, Zurich, Switzerland, and the Henry Booker Gold Medal from URSI, as well as other prizes and awards. Currently, he holds the title "Distinguished University Professor" in the ECE Department at McMaster University, Canada.

Thursday 24 May

08.30 to 10.00 • Cipressi Room

08.30

Exercising demons: quantum Brownian motors [6600-502]

Peter Hänggi, Univ. Augsburg (Germany)

Abstract: Noise is usually thought of as the enemy of order rather than of a constructive influence. For the phenomena of Brownian motors [1,2,3], however, noise can play a beneficial role in enhancing and facilitating directed transport in absence of biasing forces. We identify variety of intriguing beneficial applications in physical, technological, and biomedical contexts. In their modus operandi such quantum Brownian motor use the energy from the haphazard source of thermal quantum noise in order to perform work against external loads. The basic principles that underpin directed quantum transport in quantum optical and solid-state based devices are elucidated for various nonlinear quantum systems. The very presence of non-equilibrium disturbances enables a Quantum Brownian motor to overcome the limiting laws imposed by thermal equilibrium, thereby rectifying quantum Brownian motion for shuttling efficiently quantum objects along a priori designed routes.

[1] R. D. Astumian and P. Hänggi, Brownian motors, Physics Today 55 (11), 33 (2002).
[2] H. Linke, editor, Special Issue on Brownian Motors, Applied Physics A 75, No. 2 (2002).
[3] P. Hänggi, F. Marchesoni, F. Nori, Brownian motors, Ann. Physik (Berlin) 14, 51 (2005).

Biography: Peter Hanggi obtained his PhD in 1977 from the University of Basel, Switzerland. He then performed research at various institutions both in Europe and in the United States before accepting an academic position at the Polytechnic Institute of New York in 1980. In 1986 he moved to his current position as a full Professor (Ordinarius) at the University of Augsburg where he built up a new Physics Department. He is an elected fellow of the IOP, the APS and the AAAS. He is an elected member of the German Academy of Natural Scientists LEOPOLDINA and as well an elected member of the Max-Planck Society and external member of the Max-Planck Institute for the Physics of Complex Systems MPI-PKS) in Dresden. He has obtained several awards, including the Eminent Riken Award, the Medal of Honor from The Jagellonian University in Krakow, The Nicolas Cabrera Professorship from The Universidad Autonoma de Madrid, The Elena Aizen de Moshinsky Chair of the National University of Mexico, and his five degrees "Doctor Honoris Causa" from the Universities in Katowice (Poland), Camerino (Italy), Barcelona (Spain), Kazan (Russia) and the National Academy of Sciences of Ukraine. He also holds a visiting Professorship at the National University of Singapore (NUS).

09.15

A biomimetic approach to signal coding: Suprathreshold stochastic resonance with applications [6602-501]

Nigel Stocks, Univ. of Warwick (United Kingdom)

Abstract: Engineers often look to Nature for methods of improving conventional engineering design. Signal detection and encoding is no different. It is widely accepted that neural systems code signals (information) in a highly efficient manner - achieving high information rates that are close to the entropy rates of the spike trains themselves. Furthermore, assumptions of optimal coding have proven successful in predicting known sensory coding characteristics. This highly efficient coding of sensory information means that our senses are able to achieve remarkable levels of performance. What is perhaps surprising is that sensory neurons only have output signal-to-noise-ratios (SNRs) in the range 0-10dB. This implies that the internal noise levels found in biological sensory system are more than a million times larger than those in man-made high-fidelity signal processing systems. From an engineering perspective this is remarkable. How biological sensory systems achieve such outstanding performance given the levels of noise is not well understood.

In this presentation, we discuss recent work on the interplay between optimal coding of information and the level of internal noise. Some simple models of neural populations are presented that have been optimised to transmit information maximally at a fixed level of noise. We demonstrate that optimal coding leads to a hierarchy of codes that depends on the noise level. Furthermore, we show that optimal coding leads directly to the concept of suprathreshold stochastic resonance (SSR); SSR is a novel form of stochastic resonance that occurs for signals of all magnitudes not just subthreshold ones. The possible application of SSR to cochlear implant coding as well as other coding applications is discussed.

Biography: Nigel G Stocks received a First Class BSc in Applied Physics and Electronics from Lancaster University in 1987 and, under the supervision Prof. PVE McClintock, a PhD in stochastic nonlinear dynamics in 1991. His early research work was undertaken in the Lancaster Nonlinear Group and focused on the development of the theory of nonequilibriun dynamical systems and, in particular, on stochastic resonance. Dr Stocks moved to the University of Warwick 1993 where he joined the Fluid Dynamics Research Centre and undertook studies on transition to turbulence. In 1996 he was awarded a TMR EU Fellowship and worked with Prof. Riccardo Mannella at Pisa University before subsequently returning to Warwick as a University of Warwick Research Fellow. He was promoted to Senior lecturer in 2002 and then to Reader in 2005.

Dr Stocks' research interests lay in the general area of stochastic nonlinear systems and biomimetics. In particular, research has focused on neural coding mechanisms for cochlear implants and the development of biomimetic signal processing techniques. This has recently led to the discovery of a form of stochastic resonance - termed suprathreshold stochastic resonance - that promises to improve signal coding in a wide range of potential applications.

Monday-Thursday 21-24 May 2007 • Proceedings of SPIE Vol. 6600

Noise and Fluctuations in Circuits, Devices, and Materials

Conference Chair: **Massimo Macucci**, Univ. di Pisa (Italy)

Cochairs: **Lode K. Vandamme**, Technische Univ. Eindhoven (Netherlands); **Carmine Ciofi**, Univ. degli Studi di Messina (Italy); **Michael B. Weissman**, Univ. of Illinois at Urbana-Champaign (USA)

Program Committee: **Alexander A. Balandin**, Univ. of California/Riverside (USA); **Fabrizio Bonani**, Politecnico di Torino (Italy); **M. Jamal Deen**, McMaster Univ. (Canada); **Gianfranco Durin**, Istituto Elettrotecnico Nazionale Galileo Ferraris (Italy); **Daniel M. Fleetwood**, Vanderbilt Univ. (USA); **Gérard Ghibaudo**, ENSERG (France); **Giuseppe Iannaccone**, Univ. di Pisa (Italy); **Slavik V. Melkonyan**, Yerevan State Univ. (Armenia); **Zvi Ovadyahu**, The Hebrew Univ. of Jerusalem (Israel); **Dragana Popovic**, Florida State Univ. (USA)

Monday 21 May

SESSION P1: Plenary Session I

Chair: **Leon Cohen**, Hunter College/CUNY (USA)

Room: Limonaia . . . . . Mon. 08.20 to 10.00

Welcome and Introduction . . . . . 08.20 to 08.30

08.30: **Answering open questions in the Bose-Einstein condensation of ideal and interacting Bose gases via a hybrid mixture of laser and statistical physics** *(Invited Paper)*, M. O. Scully, Texas A&M Univ. (USA) and Princeton Univ. (USA); V. V. Kocharovsky, Texas A&M Univ. (USA); V. V. Kocharovsky, Institute of Applied Physics (Russia); A. A. Svidzinsky, M. S. Zubairy, Texas A&M Univ. (USA) . . . . . [6603-500]

09.15: **The ever-fluctuating protein** *(Invited Paper)*, J. Klafter, Tel Aviv Univ. (Israel); O. Flomenbom, Massachusetts Institute of Technology (USA); R. Granek, Ben-Gurion Univ. of the Negev (Israel) . [6602-500]

Coffee Break . . . . . 10.00 to 10.30

SESSION 1

Room: Uliveto . . . . . Mon. 10.30 to 12.05

Noise in Mesoscopic and Quantum Devices I

Chair: **Massimo Macucci**, Univ. di Pisa (Italy)

10.30: **Stationary and non-stationary noise in superconducting quantum devices *(Invited Paper)*,** I. Martin, Los Alamos National Lab. (USA) . . . . . [6600-02]

10.55: **Shot noise and conductance fluctuations in transport through regular vs. chaotic cavities *(Invited Paper)*,** S. Rotter, Yale Univ. (USA); F. Aigner, J. Burgdoerfer, Technische Univ. Wien (Austria); A. D. Stone, Yale Univ. (USA) . . . . . [6600-23]

11.20: **A deterministic solver for the Langevin Boltzmann equation including the Pauli principle,** C. A. Jungemann, Technische Univ. Braunschweig (Germany) . . . . . [6600-03]

11.35: **Adiabatic ac-drive as a means for acceleration of diffusion in spatially periodic structures and for enhancement of escape flux in threshold devices,** R. Mannella, Univ. degli Studi di Pisa (Italy); S. M. Soskin, Institute of Semiconductor Physics (Ukraine); O. Yevtushenko, Abdus Salam International Ctr. for Theoretical Physics (Italy) . [6600-04]

11.50: **Numerical investigation of noise and transport properties of multiple mesoscopic cavities,** P. Marconcini, M. Macucci, Univ. degli Studi di Pisa (Italy) . . . . . [6600-05]

Lunch Break . . . . . 12.05 to 14.00

SESSION 2

Room: Uliveto . . . . . Mon. 14.00 to 15.35

Low-Frequency Noise in Electron Devices I

Chair: **Sergey D. Rumyantsev**, General Physics Institute (Russia)

Keynote

14.00: **Reducing the 1/f noise contributions of accidental defects in advanced semiconductor devices *(Invited Paper)***, G. Bosman, Univ. of Florida (USA) . . . . . [6600-06]

14.35: **Switching and noise in conductive polymers for non-volatile organic memories**, L. K. Vandamme, Technische Univ. Eindhoven (Netherlands); M. Cölle, D. M. de Leeuw, Philips Research Labs. (Netherlands) . . . . . [6600-07]

14.50: **On the mechanisms of low-frequency noise in vertical silicon pnp BJTs**, P. Cheng, E. Zhao, J. D. Cressler, Georgia Institute of Technology (USA); J. S. Prasad, Maxim Integrated Products (USA) . . . . . [6600-08]

15.05: **Low-frequency noise characterizations of GaN-based visible-blind UV detectors fabricated using a double buffer layer structure**, H. Lui, P. Fong, C. C. Surya, The Hong Kong Polytechnic Univ. (Hong Kong China) . . . . . [6600-09]

15.20: **A semiconductor device noise model: integration of Poisson type stochastic Ohmic contact conditions with semiclassical transport**, B. Noaman, C. E. Korman, The George Washington Univ. (USA); A. J. Piazza, Applied Wave Research (USA) . . . . . [6600-10]

Coffee Break . . . . . 15.35 to 16.00

SESSION 3

Room: Uliveto . . . . . Mon. 16.00 to 18.25

Low-Frequency Noise in Electron Devices II

Chair: **Gijs Bosman**, Univ. of Florida (USA)

16.00: **On the origin of 1/f noise in MOSFETs *(Invited Paper)***, L. K. Vandamme, Technische Univ. Eindhoven (Netherlands) . . . . . [6600-11]

16.35: **Low frequency noise and random telegraph noise in SiGe:C heterojunction bipolar transistors: impact of carbon concentration *(Invited Paper)***, J. Raoult, F. Pascal, C. Roustant-Delseny, Univ. Montpellier II (France); M. Marin, STMicroelectronics (France); M. J. Deen, McMaster Univ. (Canada) . . . . . [6600-12]

17.10: **1/f noise in SiGe HBTs fabricated on CMOS-compatible thin-film SOI**, M. Bellini, T. Cheng, A. Appaswamy, J. D. Cressler, Georgia Institute of Technology (USA); J. Cai, IBM Thomas J. Watson Research Ctr. (USA) . . . . . [6600-13]

17.25: **Current and optical low-frequency noise of GaInN/GaN green light emitting diodes**, S. L. Rumyantsev, Rensselaer Polytechnic Institute (USA) and Ioffe Institute of Russian Academy of Sciences (Russia); C. Wetzel, M. S. Shur, Rensselaer Polytechnic Institute (USA) . . . [6600-14]

17.40: **Impact of BOX/substrate interface on LF noise in FD-SOI devices**, L. Zafari, J. Jomaah, G. Ghibaudo, Ecole Nationale Supérieure d'Electronique et de Radioélectricité de Grenoble (France) . . . [6600-15]

17.55: **Very low noise voltage references for low frequency noise measurements**, C. Ciofi, G. Cannata, G. Scandurra, R. Merlino, Univ. degli Studi di Messina (Italy) . . . . . [6600-16]

18.10: **Noise characteristic and quality investigation of ultrafast avalanche photodiodes**, S. Pralgauskaite, V. Palenskis, J. Matukas, A. Vizbaras, Vilnius Univ. (Lithuania) . . . . . [6600-17]

Tuesday 22 May

SESSION P2: Plenary Session II

Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Room: Cipressi . . . . . Tues. 08.30 to 10.00

08.30: **Origins of randomness in statistical and quantum mechanics** *(Invited Paper)*, M. B. Weissman, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [6600-500]

09.15: **Quantum physics and number theory** *(Invited Paper, Presentation Only)*, W. P. Schleich, Univ. Ulm (Germany) . . [6603-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 4

Room: Uliveto . . . . . Tues. 10.30 to 12.00

Noise in Materials I

Chair: **Michael B. Weissma**n, Univ. of Illinois at Urbana-Champaign (USA)

Keynote

10.30: **Temporal fluctuations and spatial correlation in the dynamics of soft glassy materials *(Invited Paper, Presentation Only)***, L. Cipelletti, Univ. Montpellier 2 (France); A. Duri, Hasylab (Germany) . . . . . [6600-18]

11.05: **Nonequilibrium voltage fluctuations in superconducting wires *(Invited Paper)***, A. Frydman, Bar Ilan Univ. (Israel); M. Reznikov, The Technion (Israel); D. Prober, Yale Univ. (USA) . . . . . [6600-37]

11.30: **Violation of the fluctuation dissipation theorem in glassy systems**, M. Lucchesi, Univ. degli Studi di Pisa (Italy) and CNR-INFM Pisa (Italy); S. Capaccioli, Univ. degli Studi di Pisa (Italy) and CNR-INFM CRS-Soft Roma (Italy); D. Prevosto, Univ. degli Studi di Pisa (Italy); A. Dominjon, Univ. degli Studi di Pisa (Italy) and Univ. de Savoie (France); P. A. Rolla, Univ. degli Studi di Pisa (Italy) and CNR-INFM Pisa (Italy) . . . . . [6600-20]

11.45: **Numerical simulations of low-frequency noise in RuO_2-glass films**, A. Kolek, A. W. Stadler, Rzeszow Univ. of Technology (Poland) . . . . . [6600-21]

Lunch Break . . . . . 12.00 to 14.00

SESSION 5

Room: Uliveto . . . . . Tues. 14.00 to 15.10

Noise in Mesoscopic and Quantum Devices II

Chair: **Stefan Rotte**r, Yale Univ. (USA)

14.00: **Shot noise and coherent quantum transport through chaotic systems *(Invited Paper)***, R. S. Whitney, Institut Laue-Langevin (France) . . . . . [6600-22]

14.25: **Electric field fluctuations in organic semiconductors: using scanned probe microscopy to determine the local carrier mobility**, S. Yazdanian, S. Kuehn, R. F. Loring, J. A. Marohn, Cornell Univ. (USA) . . . . . [6600-24]

14.40: **Measurement of non Gaussian noise and noise susceptibility of a tunnel junction in the quantum regime**, J. A. Gabelli, Ctr. National de la Recherche Scientifique (France); B. M. Reulet, Yale Univ. (USA) . . . . . [6600-25]

14.55: **Quantum Gunn effect as a source of noise in n- and p-type wells**, Y. Paltiel, N. Snapi, Soreq Nuclear Research Ctr. (Israel); G. Jung, A. Ben Simon, Ben-Gurion Univ. of the Negev (Israel) . . . . . [6600-26]

Coffee Break . . . . . 15.10 to 15.40

SESSION 6

Room: Uliveto . . . . . Tues. 15.40 to 18.20

Noise in Sensing and Measurements

Chair: **Marco Sampietr**o, Politecnico di Milano (Italy)

Keynote

15.40: **Fluctuation-enhanced sensing *(Invited Paper)***, L. B. Kish, Texas A&M Univ. (USA); G. Schmera, Space and Naval Warfare Systems Ctr./ San Diego (USA); J. M. Smulko, Gdansk Univ. of Technology (Poland); C. Kwan, Signal Processing Inc. (USA); C. Granqvist, Uppsala Univ. (Sweden) . . . . . [6600-27]

16.15: **Spin dynamics and fluctuations at atomic limit *(Invited Paper)***, A. V. Balatsky, Los Alamos National Lab. (USA) . . . . . [6600-28]

16.40: **Coupling nonlinear oscillators for fun and profit *(Invited Paper)***, A. R. Bulsara, Space and Naval Warfare Systems Command (USA) . . . . . [6600-75]

17.05: **Noise optimization of an active pixel sensor for real-time digital x-ray fluoroscopy**, M. H. Izadi, K. S. Karim, Simon Fraser Univ. (Canada) . . . . . [6600-29]

17.20: **Utilising jitter noise in the precise synchronisation of laser pulses**, R. Mingesz, Z. Gingl, Univ. of Szeged (Hungary); G. Almási, Univ. of Pécs (Hungary); P. Makra, Univ. of Szeged (Hungary) . . . . . [6600-30]

17.35: **Vibration-induced conductivity fluctuation measurement for soil bulk density analysis**, A. S. Kishne, C. L. S. Morgan, L. B. Kish, Texas A&M Univ. (USA) . . . . . [6600-32]

17.50: **SNDR Gain in noisy sinusoidal signals by non-linear processing elements**, F. Martorell, Univ. Politècnica de Catalunya (Spain); M. D. McDonnell, The Univ. of Adelaide (Australia); A. Rubio, Univ. Politècnica de Catalunya (Spain); D. Abbott, The Univ. of Adelaide (Australia) . . . . . [6600-33]

18.05: **Four channels cross correlation method for high sensitivity current noise measurements**, C. Ciofi, G. Scandurra, R. Merlino, G. Cannata, G. Giusi, Univ. degli Studi di Messina (Italy) . . . . . [6600-35]

Debate Session

Room: Cipressi . . . . . 18.15 to 19.45

Stochastic Resonance—Trivial or Not?

Chair: **Derek Abbott,** The Univ. of Adelaide (Australia)

Join us for a lively debate. Two teams holding opposing views will debate the topic.

Banquet

Room: Limonaia . . . . . 20.00 to 21.30

The History of Noise: The Scandals

Banquet Presenter: **Leon Cohen,** Hunter College/CUNY (USA)

Wednesday 23 May

SESSION P3: Plenary Session III

Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

Room: Cipressi . . . . . Wed. 08.30 to 10.00

08.30: **Thermal noise informatics: totally secure communication via a wire, zero-power communication, and thermal noise driven computing** *(Invited Paper)*, L. B. Kish, Texas A&M Univ. (USA) . . . . . [6600-501]

09.15: **On the relationship between the Langevin equation and stochasticity of the LMS algorithm** *(Invited Paper)*, S. Haykin, McMaster Univ. (Canada) . . . . . [6601-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 7

Room: Uliveto . . . . . Wed. 10.30 to 12.00

Noise in Materials II

Chair: **Luca Cipelletti**, Univ. Montpellier II (France)

Keynote

10.30: **Imaging spatio-temporal fluctuations and local susceptibility in disordered polymers *(Invited Paper)***, N. E. Israeloff, P. Crider, M. Majewski, J. Zhang, H. Oukris, Northeastern Univ. (USA) . . . . [6600-36]

11.05: **Hysteresis and noise in stripe and clump forming systems *(Invited Paper)***, C. M. Reichhardt, Los Alamos National Lab. (USA) . . . . . [6600-19]

11.30: **Noise evidence for intermittent channelled vortex motion in laser-processed YBaCuO**, G. Jung, Ben Gurion Univ. of Negev (Israel); A. Jukna, Semiconductor Physics Institute (Lithuania); I. Barboy, Ben-Gurion Univ. of Negev (Israel); S. Banerjee, Indian Institute of Technology Kanpur (India); A. Abrutis, Vilnius Univ. (Lithuania); X. Li, D. Wang, R. Sobolewski, Univ. of Rochester (USA) . . . . . [6600-61]

11.45: **Fluctuation-induced first order transition due to Griffiths anomalies of the Custer glass phase**, V. Dobrosavljevic, M. J. Case, Florida State Univ. (USA) . . . . . [6600-39]

Lunch Break . . . . . 12.00 to 14.00

SESSION 8

Room: Uliveto . . . . . Wed. 14.00 to 14.55

Noise Modeling and Measurements in Devices

Chair: **G. Ali Rezvani**, RFMD (USA)

14.00: **Numerical modeling of electron noise in nanoscale Si devices *(Invited Paper)***, C. A. Jungemann, Technische Univ. Braunschweig (Germany) . . . . . [6600-40]

14.25: **Microscopic modeling of impact-ionization noise in SiGe heterobipolar transistors**, M. Ramonas, Univ. der Bundeswehr München (Germany) and Semiconductor Physics Institute (Lithuania); C. A. Jungemann, Technische Univ. Braunschweig (Germany); P. Sakalas, Technische Univ. Dresden (Germany) and Semiconductor Physics Institute (Lithuania); M. Schroter, Technische Univ. Dresden (Germany) and Univ. of California/San Diego (USA) . . . . . [6600-41]

14.40: **Correlation of current noise behavior and dark spot formation in organic light-emitting diodes**, L. Ke, S. J. Chua, Institute of Materials Research and Engineering (Singapore) . . . . . [6600-43]

Coffee Break . . . . . 14.55 to 15.40

SESSION 9

Room: Uliveto . . . . . Wed. 15.40 to 17.00

Noise in Field Effect Devices

Chair: **Lode K. Vandamme**, Technische Univ. Eindhoven (Netherlands)

15.40: **Low frequency gate noise modeling of ultrathin oxide MOSFETs *(Invited Paper)***, F. Martinez, M. Valenza, Univ. Montpellier 2 (France) . . . . . [6600-44]

16.05: **Challenges in HF noise characterization and modeling of Sub-100nm MOSFETs for RF ICs *(Invited Paper)***, C. J. Chen, McMaster Univ. (Canada); Z. Zeng, J. Jan, United Microelectronics Corp. (USA); C. Yeh, United Microelectronics Corp. (Taiwan) . . . . . [6600-46]

16.30: **Characterization and model enablement of high-frequency noise in 90nm CMOS technology**, Z. Jin, IBM Corp. (USA) . . [6600-47]

16.45: **Performance limits of simulation models for noise characterization of mm-wave devices**, A. Abou-Elnour, Ajman Univ. of Science & Technology Network (United Arab Emirates) . . . . . [6600-48]

✔ Posters-Wednesday

Posters will be on display in the conference room on Wednesday. Authors should affix their poster with the material provided in the designated area under their poster number during the morning coffee break. Posters not removed at the end of the day will be considered unwanted and discarded.

✔ **Enhancement on the signal-to-noise ratio of T-ray liquid spectroscopy via double-modulated differential time-domain spectroscopy**, J. Balakrishnan, B. M. Fischer, The Univ. of Adelaide (Australia); S. P. Mickan, Davies Collison Cave (Australia); D. Abbott, The Univ. of Adelaide (Australia) . . . . . [6600-31]

✔ **Noise, temporal and sensitive properties of high-Tc superconducting bolometers in electrothermal feedback modes**, I. A. Khrebtov, K. V. Ivanov, V. G. Malyarov, S.I. Vavilov State Optical Institute (Russia) . . . . . [6600-34]

✔ **Mechanical-thermal noise characterization of a new micromachined acoustic sensor**, B. Mezghani, Ecole Nationale d'Ingénieurs de Sfax (Tunisia) . . . . . [6600-58]

✔ **Theoretical aspects of nonlinear thermal fluctuations**, B. M. Grafov, A.N.Frumkin Institute of Physical Chemistry and Electrochemistry of Russian Academy of Sciences (Russia) . . . . . [6600-59]

✔ **Generation-recombination noise in forward-biased 4H-SiC p-n diode**, S. L. Rumyantsev, Rensselaer Polytechnic Institute (USA) and A.F. Ioffe Physical-Technical Institute (USA); A. Dmitriev, M. E. Levinshtein, A.F. Ioffe Physical-Technical Institute (Russia); D. B. Veksler, M. S. Shur, Rensselaer Polytechnic Institute (USA); J. Palmour, M. Das, B. Hull, Cree, Inc. (USA) . . . . . [6600-60]

✔ **Signal recovery from mixed coherent signal and noise**, M. R. Salehi, Shiraz Univ. (Iran) . . . . . [6600-62]

✔ **Noise characteristics and reliability of light emitting diodes based on nitrides**, S. Pralgauskaite, V. Palenskis, J. Matukas, J. Petrulis, Vilnius Univ. (Lithuania) . . . . . [6600-63]

✔ **Main sources of electron mobility fluctuations in semiconductors**, S. V. Melkonyan, F. V. Gasparyan, H. V. Asriyan, Yerevan State Univ. (Armenia) . . . . . [6600-64]

✔ **Usage of micro-plasma noise signal for solar cells diagnostic**, J. Vanek, P. Koktavy, K. Kubickova, P. Sadovsky, M. Raska, Brno Univ. of Technology (Czech Republic) . . . . . [6600-65]

✔ **Noises of p-i-n UV photodetectors**, F. V. Gasparyan, Yerevan State Univ. (Armenia); C. E. Korman, The George Washington Univ. (USA); S. V. Melkonyan, Yerevan State Univ. (Armenia) . . . . . [6600-67]

✔ **Noise spectroscopy of new silicon solar cells with double-sided texture**, Z. Chobola, V. Jurankova, J. Vanek, Brno Univ. of Technology (Czech Republic); R. Barinka, Solartec s.r.o. (Czech Republic)[6600-68]

✔ **Noise in superconducting MgB_2 thin film**, B. Lakew, NASA Goddard Space Flight Ctr. (USA); S. Aslam, Muniz Engineering, Inc. (USA); H. H. Jones, NASA Goddard Space Flight Ctr. (USA) . . . . . [6600-69]

✔ **Impact of self-heating in LF noise measurements with voltage amplifiers**, A. A. Lisboa de Souza, J. Nallatamby, M. Prigent, J. D. Obregon, Univ. de Limoges (France) . . . . . [6600-70]

✔ **Calculation of the trispectrum of equilibrium current fluctuations in semiconductor diode**, A. A. Dubkov, N.I. Lobachevsky State Univ. of Nizhni Novgorod (Russia) . . . . . [6600-71]

✔ **Analysis of FET oscillator noise in fundamental and harmonic mode**, A. Abou-Elnour, O. Abo-Elnor, Ajman Univ. of Science & Technology Network (United Arab Emirates) . . . . . [6600-72]

✔ **Revealing, identifying and assessing flaw development in high chromium steels by quantitative acoustic emission non-destructive inspection method**, G. Muravin, B. Muravin, L. Lezvinsky, Margan Physical Diagnostics Ltd. (Israel) . . . . . [6600-73]

✔ **Very long decay time for electron velocity distribution in semiconductors, and consequent 1/f noise**, G. Cavalleri, Univ. Cattolica del Sacro Cuore (Italy); L. Bosi, Politecnico di Milano (Italy); E. Tonni, Univ. Cattolica del Sacro Cuore (Italy) . . . . . [6600-74]

Thursday 24 May

SESSION P4: Plenary Session IV

Chair: **Massimo Macucci**, Univ. di Pisa (Italy)

Room: Cipressi . . . . . Thurs. 08.30 to 10.00

08.30: **Exercising demons: quantum Brownian motors** *(Invited Paper)*, P. Hänggi, Univ. Augsburg (Germany) . . . . . [6602-501]

09.15: **A biomimetic approach to signal coding: suprathreshold stochastic resonance with applications** *(Invited Paper, Presentation Only)*, N. G. Stocks, A. P. Nikitin, B. V. Shulgin, Univ. of Warwick (United Kingdom); R. P. Morse, Aston Univ. (United Kingdom); M. D. McDonnell, D. Abbott, The Univ. of Adelaide (Australia) . . [6600-502]

Coffee Break . . . . . 10.00 to 10.30

SESSION 10

Room: Uliveto . . . . . Thurs. 10.30 to 12.00

Noise in Circuits

Chair: **Laszlo B. Kis**h, Texas A&M Univ. (USA)

Keynote

10.30: **Correlation technique to reach ultimate resolution in noise measurements *(Invited Paper)***, M. Sampietro, G. Ferrari, Politecnico di Milano (Italy) . . . . . [6600-49]

11.05: **Application of physical models to circuit simulations *(Invited Paper)***, F. Bonani, F. Bertazzi, G. Conte, S. Donati Guerrieri, G. Ghione, Politecnico di Torino (Italy) . . . . . [6600-50]

11.30: **Measurements to reveal phase-noise producing mechanisms in resonator-oscillators**, M. H. W. Hoffmann, Univ. Ulm (Germany) . . . . . [6600-51]

11.45: **Digital switching noise as a stochastic process**, G. Boselli, G. Trucco, V. Liberali, Univ. degli Studi di Milano (Italy) . . . . . [6600-52]

SESSION 11

Room: Montughi . . . . . Thurs. 10.30 to 12.05

Noise in Materials III

Chair: **Nathan E. Israeloff**, Northeastern Univ. (USA)

10.30: **Magnetic hysteresis and noise in high Tc superconductors *(Invited Paper)***, C. Panagopoulos, Univ. of Cambridge (United Kingdom) . . . . . [6600-53]

10.55: **Measurement noise maximum as a signature of a phase transition *(Invited Paper)***, Z. Chen, C. C. Yu, Univ. of California/Irvine (USA) . . . . . [6600-54]

11.20: **High-order spectra in crackling noise with avalanche asymmetry**, A. C. Mills, M. B. Weissman, Univ. of Illinois at Urbana-Champaign (USA); F. Colaiori, C. Castellano, S. Zapperi, Univ. degli Studi di Roma/La Sapienza (Italy); G. Durin, Istituto Elettrotecnico Nazionale Galileo Ferraris (Italy) . . . . . [6600-55]

11.35: **Low-temperature resistance noise study in underdoped $La_{2-x}Sr_xCuO_4$**, I. Raicevic, J. J. Jaroszynski, D. Popovic, Florida State Univ. (USA); G. Jelbert, C. Panagopoulos, Univ. of Cambridge (United Kingdom); T. Sasagawa, Stanford Univ. (USA) . . . . . [6600-56]

11.50: **Electronic noise in silicon nitride ceramics doped by carbon allotropes**, B. Szentpáli, P. Artó, Research Institute for Technical Physics and Materials Science (Hungary) . . . . . [6600-57]

Monday-Thursday 21-24 May 2007 • Proceedings of SPIE Vol. 6601

Noise and Stochastics in Complex Systems and Finance

Conference Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Cochairs: **Stefan Bornholdt**, Univ. Bremen (Germany); **Rosario N. Mantegna**, Univ. di Palermo (Italy)

Program Committee: **Albert-Laszló Barabási**, Univ. of Notre Dame (USA); **Jean-Philippe M. Bouchaud**, Capital Fund Management (France); **Zdzislaw Burda**, Jagiellonian Univ. (Poland); **J. Doyne Farmer**, Santa Fe Institute (USA); **Giampiero M. Gallo**, Univ. degli Studi di Firenze (Italy); **Giulia Iori**, City Univ. London (United Kingdom); **Neil F. Johnson**, Univ. of Oxford (United Kingdom); **Kimmo K. Kaski**, Helsinki Univ. of Technology (Finland); **Thomas Lux**, Christian-Albrechts-Univ. zu Kiel (Germany); **Matteo Marsili**, Abdus Salam International Ctr. for Theoretical Physics (Italy); **Sergei Maslov**, Brookhaven National Lab. (USA); **Kim Sneppen**, Niels Bohr Institute (Denmark); **Didier Sornette**, ETH Zurich (Switzerland); **Dietrich Stauffer**, Univ. zu Köln (Germany); **Alessandro Vespignani**, Indiana Univ. (USA); **Tamás Vicsek**, Eötvös Loránd Univ. (Hungary)

Monday 21 May

SESSION P1: Plenary Session I

Chair: **Leon Cohen**, Hunter College/CUNY (USA)

Room: Limonaia . . . . . Mon. 08.20 to 10.00

Welcome and Introduction . . . . . 08.20 to 08.30

08.30: **Answering open questions in the Bose-Einstein condensation of ideal and interacting Bose gases via a hybrid mixture of laser and statistical physics** *(Invited Paper)*, M. O. Scully, Texas A&M Univ. (USA) and Princeton Univ. (USA); V. V. Kocharovsky, Texas A&M Univ. (USA); V. V. Kocharovsky, Institute of Applied Physics (Russia); A. A. Svidzinsky, M. S. Zubairy, Texas A&M Univ. (USA) . . . . . [6603-500]

09.15: **The ever-fluctuating protein** *(Invited Paper)*, J. Klafter, Tel Aviv Univ. (Israel); O. Flomenbom, Massachusetts Institute of Technology (USA); R. Granek, Ben-Gurion Univ. of the Negev (Israel) . [6602-500]

Coffee Break . . . . . 10.00 to 10.30

SESSION 1

Room: Montughi . . . . . Mon. 10.30 to 12.50

Market Strategies

Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Keynote

10.30: **How markets digest fluctuations in supply and demand *(Invited Paper)*,** J. D. Farmer, A. Gerig, Santa Fe Institute (USA); F. Lillo, Univ. degli Studi di Palermo (Italy) . . . . . [6601-01]

11.30: **Trading strategies and ecological interaction of firms in a financial market *(Invited Paper)*,** F. Lillo, Univ. degli Studi di Palermo (Italy) and Santa Fe Institute (USA) . . . . . [6601-02]

12.10: **Random correlation matrices, top eigenvalue with heavy tails and financial applications *(Invited Paper)*,** J. M. Bouchaud, Commissariat à l'Energie Atomique (France) . . . . . [6601-03]

Lunch Break . . . . . 12.50 to 14.20

SESSION 2

Room: Montughi . . . . . Mon. 14.20 to 18.30

Structure and Communities in Networks

Chair: **José F. Mendes**, Univ. de Aveiro (Portugal)

14.20: **Structure and tie strengths in a large-scale social network *(Invited Paper)*,** J. J. Onnela, Univ. of Oxford (United Kingdom) [6601-04]

15.00: **Community dynamics in social networks *(Invited Paper)*,** G. Palla, Eotvos Univ. (Hungary); A. Barabasi, Univ. of Notre Dame (USA); T. Vicsek, Eotvos Univ. (Hungary) . . . . . [6601-05]

15.40: **The origin of scaling on networks, structural inhomogeneity and preference in dynamical behaviour,** B. Kujawski, Brunel Univ. (United Kingdom); B. Tadic, Institut Jozef Stefan (Slovenia); G. J. Rodgers, Brunel Univ. (United Kingdom) . . . . . [6601-06]

Coffee Break . . . . . 16.00 to 16.30

16.30: **Quality functions in community detection *(Invited Paper)*,** S. Fortunato, Indiana Univ. (USA) . . . . . [6601-07]

17.10: **Structure of LiveJournal social network,** P. Zakharov, Univ. of Fribourg (Switzerland) . . . . . [6601-08]

17.30: **Starling flocks: an experimental study of complex collective dynamics *(Invited Paper)*,** A. Cavagna, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6601-09]

18.10: **Modeling social networks and social dynamics,** J. Kumpula, R. Toivonen, J. Saramäki, Helsinki Univ. of Technology (Finland); J. J. Onnela, Univ. of Oxford (United Kingdom) and Helsinki Univ. of Technology (Finland); J. Kertész, Budapest Univ. of Technology and Economics (Hungary) and Helsinki Univ. of Technology (Finland); K. K. Kaski, Helsinki Univ. of Technology (Finland) . . . . . [6601-10]

Tuesday 22 May

SESSION P2: Plenary Session II

Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Room: Cipressi . . . . . Tues. 08.30 to 10.00

08.30: **Origins of randomness in statistical and quantum mechanics** *(Invited Paper)*, M. B. Weissman, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [6600-500]

09.15: **Quantum physics and number theory** *(Invited Paper, Presentation Only)*, W. P. Schleich, Univ. Ulm (Germany) . . [6603-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 3

Room: Montughi . . . . . Tues. 10.30 to 12.50

Network Structure and Function

Chair: **Santo Fortunato**, ISI Foundation (Italy)

Keynote

10.30: **Properties of fractal and non-fractal scale-free networks *(Invited Paper)*,** S. Havlin, M. Kitsak, G. Paul, Boston Univ. (USA); M. Riccaboni, F. Pammolli, Univ. degli Studi di Firenze (Italy); H. E. Stanley, Boston Univ. (USA) . . . . . [6601-11]

11.30: **Structural properties of complex networks *(Invited Paper)*,** J. F. Mendes, Univ. de Aveiro (Portugal) . . . . . [6601-12]

12.10: **Emerging behavior in online biddings *(Invited Paper)*,** B. Kahng, Seoul National Univ. (South Korea) . . . . . [6601-13]

Lunch Break . . . . . 12.50 to 14.20

SESSION 4

Room: Montughi . . . . . Tues. 14.20 to 18.10

Financial Fluctuations

Chair: **Felix Reed-Tsochas**, Univ. of Oxford Said Business School (United Kingdom)

14.20: **High frequency correlation measures *(Invited Paper)*,** G. Iori, City Univ. (United Kingdom) . . . . . [6601-14]

15.00: **Scaling theory and size-dependent fluctuations in stock market data,** Z. Eisler, Budapest Univ. of Technology and Economics (Hungary) . . . . . [6601-15]

15.20: **Detect complex correlations in financial time series,** V. Alfi, L. Pietronero, Univ. degli Studi di Roma/La Sapienza (Italy) . . . . . [6601-16]

Coffee Break . . . . . 15.40 to 16.10

16.10: **Wealth distribution in kinetic market model with one nonconsumable commodity *(Invited Paper)*,** B. K. Chakrabarti, A. Chatterjee, Saha Institute of Nuclear Physics (India) . . . . . [6601-17]

16.50: **The Epps effect revisited,** B. Toth, J. Kertész, Budapest Univ. of Technology and Economics (Hungary) . . . . . [6601-18]

17.10: **Statistics of extreme values in time series with intermediate-term correlations,** C. Pennetta, Univ. degli Studi di Lecce (Italy)[6601-19]

17.30: **Statistics of extremes, traffic jams and natural disasters,** R. D. Kühne, Deutsches Zentrum für Luft- und Raumfahrt e.V. (Germany) . . . . . [6601-20]

17.50: **Time-frequency analysis of econometric time series,** L. Cohen, S. Corinaldi, Hunter College/CUNY (USA) . . . . . [6601-44]

✔ Posters-Tuesday

Posters will be on display in the conference room on Tuesday. Authors should affix their poster with the material provided in the designated area under their poster number during the morning coffee break. Posters not removed at the end of the day will be considered unwanted and discarded.

✔ **Identifying the diffusion covariation and the co-jumps given discrete observations,** F. Gobbi, Univ. degli Studi di Firenze (Italy) . . . . . [6601-36]

✔ **Statistics of level crossing intervals: discretized version and comparison with experimental studies,** N. Fuchikami, Tokyo Metropolitan Univ. (Japan); S. Ishioka, Kanagawa Univ. (Japan) . . . . . [6601-37]

✔ **Statistical mechanics of simplicial complexes,** M. Rajkovic, Z. Mihailovic, S. Maletic, Vinca Institute of Nuclear Sciences (Serbia and Montenegro) . . . . . [6601-38]

✔ **Finding key-words amongst noise: automatic text classification without parsing,** A. G. Allison, D. Abbott, The Univ. of Adelaide (Australia) . . . . . [6601-39]

✔ **Dynamical complexity in intermittent turbulent systems,** V. Uritsky, M. Paczuski, Univ. of Calgary (Canada) . . . . . [6601-40]

✔ **A Bayesian estimation of a stochastic predator-prey model of economic fluctuations,** D. G. Luchinsky, NASA Ames Research Ctr. (United Kingdom); D. D. Luchinskaya, Univ. of Oxford (United Kingdom); V. N. Smelyanskiy, NASA Ames Research Ctr. (USA); G. Dibeh, Lebanese American Univ. (Lebanon) . . . . . [6601-41]

✔ **Diffusive approximation for limit order execution times,** Z. Eisler, Budapest Univ. of Technology and Economics (Hungary) . . [6601-42]

✔ **Limited resolution in complex network community detection,** J. Kumpula, J. Saramäki, K. K. Kaski, Helsinki Univ. of Technology (Finland); J. Kertész, Budapest Univ. of Technology and Economics (Hungary) . . . . . [6601-43]

✔ **International tourism networks,** J. I. Miguéns, Univ. of Aveiro (Portugal) . . . . . [6601-47]

Debate Session

Room: Cipressi . . . . . 18.15 to 19.45

Stochastic Resonance—Trivial or Not?

Chair: **Derek Abbott,** The Univ. of Adelaide (Australia)

Join us for a lively debate. Two teams holding opposing views will debate the topic.

Banquet

Room: Limonaia . . . . . 20.00 to 21.30

The History of Noise: The Scandals

Banquet Presenter: **Leon Cohen,** Hunter College/CUNY (USA)

Wednesday 23 May

SESSION P3: Plenary Session III

Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

Room: Cipressi . . . . . Wed. 08.30 to 10.00

08.30: **Thermal noise informatics: totally secure communication via a wire, zero-power communication, and thermal noise driven computing** *(Invited Paper)*, L. B. Kish, Texas A&M Univ. (USA) . . . . . [6600-501]

09.15: **On the relationship between the Langevin equation and stochasticity of the LMS algorithm** *(Invited Paper)*, S. Haykin, McMaster Univ. (Canada) . . . . . [6601-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: Montughi . . . . . Wed. 10.30 to 12.50

Interacting Economic Systems

Chair: **Rosario N. Mantegna**, Univ degli Studi di Palermo (Italy)

Keynote

10.30: **Evolutionary and adaptive learning in complex markets *(Invited Paper)*,** C. C. Hommes, Univ. van Amsterdam (Netherlands) . . . . . [6601-22]

11.30: **Cascades of failure and extinction in evolving complex systems *(Invited Paper)*,** P. Ormerod, Volterra Consulting (United Kingdom) . . . . . [6601-23]

12.10: **A niche model for a complex buyer-seller network *(Invited Paper)*,** F. Reed-Tsochas, S. Saavedra, Univ. of Oxford (United Kingdom); B. Uzzi, Northwestern Univ. (USA) . . . . . [6601-24]

Lunch Break . . . . . 12.50 to 14.20

SESSION 6

Room: Montughi . . . . . Wed. 14.20 to 18.20

Economics and Networks

Chair: **Giulia Iori**, City Univ. London (United Kingdom)

14.20: **Macroeocnomic models with non-zero dispersions *(Invited Paper)*,** M. Aoki, Univ. of California/Los Angeles (USA) . . . . . [6601-25]

15.00: **Statistical reliability of links in correlation based networks,** M. Tumminello, C. Coronnello, S. Micciche, F. Lillo, R. N. Mantegna, Univ. degli Studi di Palermo (Italy) . . . . . [6601-27]

15.20: **A fitness model for the Italian Interbank money market *(Invited Paper)*,** G. Caldarelli, INFM-CNR (Italy) . . . . . [6601-28]

Coffee Break . . . . . 16.00 to 16.30

16.30: **Dynamics of condensation of zero range processes on networks *(Invited Paper)*,** Z. Burda, Jagiellonian Univ. (Poland) [6601-29]

17.00: **An analytical approach to cascades on random networks,** J. P. Gleeson, D. Cahalane, National Univ. of Ireland/Cork (Ireland) [6601-30]

17.20: **Testing efficiency of the US stock market by detrended fluctuation analysis,** O. Uritskaya, Univ. of Calgary (Canada) [6601-31]

17.40: **Unexpected volatility and intraday serial correlation,** S. Bianco, Univ. of North Texas (USA); R. Reno, Univ. degli Studi di Siena (Italy) . . . . . [6601-32]

18.00: **Network analysis with statistical mechanics,** J. Reichardt, Univ. Würzburg (Germany) . . . . . [6601-48]

Thursday 24 May

SESSION 7

Room: Montughi . . . . . Thurs. 09.00 to 10.00

Networks and Other Complex Systems

Chair: **Guido Caldarelli**, Istituto Nazionale di Fisica Nucleare (Italy)

09.00: **Avalanche correlation in power spectra *(Invited Paper)*,** R. Eggenhöffner, Univ. degli Studi di Genova (Italy); E. Celasco, Politecnico di Torino (Italy); M. Celasco, Univ. degli Studi di Genova (Italy) [6601-33]

09.40: **Effect of random failures on traffic in complex networks,** J. Duch, A. Arenas, Rovira i Virgili Univ. (Spain) . . . . . [6601-34]

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Noise and Fluctuation in Biological, Biophysical, and Biomedical Systems

Conference Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

Cochairs: **Derek Abbott**, The Univ. of Adelaide (Australia); **Nigel G. Stocks**, The Univ. of Warwick (United Kingdom)

Program Committee: **R. Dean Astumian**, Univ. of Maine/Orono (USA); **Robert H. Austin**, Princeton Univ. (USA); **Franco Conti**, Consiglio Nazionale delle Ricerche (Italy); **Anita Goel**, Harvard Univ. (USA); **Ewa Gudowska-Nowak**, Jagellonian Univ. (Poland); **John J. Kasianowicz**, National Institute of Standards and Technology (USA); **Joseph Klafter**, Tel-Aviv Univ. (Israel); **Alexei Kornyshev**, Imperial College London (United Kingdom); **Frank E. Moss**, Univ. of Missouri/St. Louis (USA); **Miguel Rubi**, Univ. de Barcelona (Spain); **Lutz Schimansky-Geier**, Humboldt-Univ. zu Berlin (Germany); **Udo Seifert**, Univ. Stuttgart (Germany); **Igor M. Sokolov**, Humboldt-Univ. zu Berlin (Germany); **Aneta Stefanovska**, Lancaster Univ. (United Kingdom); **Christian P. Van den Broeck**, Hasselt Univ. (Belgium)

Monday 21 May

SESSION P1: Plenary Session I

Chair: **Leon Cohen**, Hunter College/CUNY (USA)

Room: Limonaia . . . . . Mon. 08.20 to 10.00

Welcome and Introduction . . . . . 08.20 to 08.30

08.30: **Answering open questions in the Bose-Einstein condensation of ideal and interacting Bose gases via a hybrid mixture of laser and statistical physics** *(Invited Paper)*, M. O. Scully, Texas A&M Univ. (USA) and Princeton Univ. (USA); V. V. Kocharovsky, Texas A&M Univ. (USA); V. V. Kocharovsky, Institute of Applied Physics (Russia); A. A. Svidzinsky, M. S. Zubairy, Texas A&M Univ. (USA) . . . . . [6603-500]

09.15: **The ever-fluctuating protein** *(Invited Paper)*, J. Klafter, Tel Aviv Univ. (Israel); O. Flomenbom, Massachusetts Institute of Technology (USA); R. Granek, Ben-Gurion Univ. of the Negev (Israel) . [6602-500]

Coffee Break . . . . . 10.00 to 10.30

SESSION 1

Room: Bolognese . . . . . Mon. 10.30 to 12.45

Single Molecules

Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

10.30: **Dynamical rupture of molecular bonds: from single molecular studies to nanomanipulation *(Invited Paper)*,** M. Urbakh, Tel Aviv Univ. (Israel) . . . . . [6602-01]

11.00: **A new model for myosin motors incorporating Brownian ratchet and powerstroke mechanisms *(Invited Paper)*,** R. Kawai, B. Geislinger, The Univ. of Alabama/Birmingham (USA) . . . . . [6602-02]

11.30: **Doubly stochastic Poisson processes and distribution of DNA *(Invited Paper)*,** E. Gudowska-Nowak, Jagiellonian Univ. (Poland) . . . . . [6602-03]

12.00: **The role of thermal fluctuations in protein-mediated DNA looping *(Invited Paper)*,** D. Wilson, J. D. Meiners, Univ. of Michigan (USA) . . . . . [6602-04]

12.30: **Computational assessment of mutation impact on domain C5 of Myosin Binding Protein C,** C. Guardiani, Univ. degli Studi di Firenze (Italy); F. Cecconi, ISC/Comitato Nazionale per le Ricerche (Italy); R. Livi, Univ. degli Studi di Firenze (Italy) . . . . . [6602-05]

Lunch Break . . . . . 12.45 to 14.15

SESSION 2

Room: Bolognese . . . . . Mon. 14.15 to 17.15

Ion Channels and Pumps

Chair: **Joseph Klafter**, Tel Aviv Univ. (Israel)

Keynote

14.15: **Toward a description of diffusion in confined media,** M. Rubi, Univ. de Barcelona (Spain) . . . . . [6602-06]

14.55: **Analytical study of a dichotomous molecular pump *(Invited Paper)*,** J. M. Sancho, A. Gomez-Marin, Univ. de Barcelona (Spain) . . . . . [6602-07]

15.25: **Effect of noise on a particle moving in a periodic potential *(Invited Paper)*,** M. Gitterman, Bar-Ilan Univ. (Israel) . . . . . [6602-08]

Coffee Break . . . . . 15.55 to 16.15

16.15: **On selectivity and gating of ionic channels *(Invited Paper)*,** D. G. Luchinsky, R. Tindjong, P. V. E. McClintock, Lancaster Univ. (United Kingdom); I. K. Kaufman, All-Russian Research Institute for Optical and Physical Measurement (Russia); R. S. Eisenberg, Rush Univ. Medical Ctr. (USA) . . . . . [6602-09]

16.45: **Self-consistent analytical solution for the current and access resistance in open ionic channels,** D. G. Luchinsky, R. Tindjong, P. V. E. McClintock, Lancaster Univ. (United Kingdom); I. K. Kaufman, All-Russian Research Institute for Optical and Physical Measurement (Russia); R. S. Eisenberg, Rush Univ. Medical Ctr. (USA) . . . . . [6602-10]

17.00: **Peculiarities of particle dynamics in channel-facilitated transport,** S. M. Bezrukov, A. M. Berezhkovskii, National Institutes of Health (USA) . . . . . [6602-11]

SESSION 3

Room: Bolognese . . . . . Mon. 17.15 to 18.00

Sensory Systems

Chair: **Nigel G. Stocks**, Univ. of Warwick (United Kingdom)

17.15: **Fluctuations in speech *(Invited Paper)*,** L. Cohen, Hunter College/CUNY (USA); S. Umesh, Indian Institute of Technology (India); D. J. Nelson, U.S. Dept. of Defense (USA) . . . . . [6602-12]

17.45: **A hierarchy of phase transitions in optimal neuronal coding: from binary to m-ary discrete optimal codes,** A. P. Nikitin, N. G. Stocks, The Univ. of Warwick (United Kingdom); R. P. Morse, Aston Univ. (United Kingdom) . . . . . [6602-13]

SESSION 4

Room: Bolognese . . . . . Mon. 18.00 to 18.15

Signal Analysis

Chair: **Nigel G. Stocks**, Univ. of Warwick (United Kingdom)

18.00: **A novel approach to fluorescence cumulant analysis for liposome characterization,** J. E. Reiner, A. Jahn, L. E. Locascio, M. Gaitan, J. J. Kasianowicz, National Institute of Standards and Technology (USA) . . . . . [6602-14]

Tuesday 22 May

SESSION P2: Plenary Session II

Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Room: Cipressi . . . . . Tues. 08.30 to 10.00

08.30: **Origins of randomness in statistical and quantum mechanics** *(Invited Paper)*, M. B. Weissman, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [6600-500]

09.15: **Quantum physics and number theory** *(Invited Paper, Presentation Only)*, W. P. Schleich, Univ. Ulm (Germany) . . [6603-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 5

Room: Bolognese . . . . . Tues. 10.30 to 15.00

Networks, Cells, Population Dynamics I

Chair: **Aneta Stefanovska**, Lancaster Univ. (United Kingdom)

Keynote

10.30: **Stochastic biogenesis of clathrin-coated vesicles,** R. Nossal, National Institutes of Health (USA) . . . . . [6602-15]

11.10: **Optimal intermittent strategies for random search *(Invited Paper)*,** G. Oshanin, Univ. Paris VI (France); K. Lindenberg, Univ. of California/San Diego (USA); H. S. Wio, Instituto de Fisica de Cantabria (Spain); S. F. Burlatsky, United Technologies Research Ctr. (USA)[6602-16]

11.40: **Stochastic dynamics of macromolecular-assembly networks *(Invited Paper)*,** J. Vilar, Memorial Sloan-Kettering Cancer Ctr. (USA) . . . . . [6602-17]

12.10: **Mechanism of IP3 induced intracellular calcium oscillations *(Invited Paper)*,** M. Falcke, Hahn-Meitner-Institut Berlin GmbH (Germany) . . . . . [6602-18]

Lunch Break . . . . . 12.40 to 14.00

SESSION 6

Room: Bolognese . . . . . Tues. 14.00 to 15.00

Networks, Cells, Population Dynamics II

Chair: **Aneta Stefanovska**, Lancaster Univ. (United Kingdom)

14.00: **Bacteria and Maxwell's demons: spontaneous concentration of swimming microorganisms via asymmetric holes *(Invited Paper)*,** P. Galajda, J. E. Keymer, R. H. Austin, Princeton Univ. (USA) . . . [6602-19]

14.30: **White noise and synchronization shaping the age structure of the human population,** S. Cebrat, K. Bonkowska, Univ. of Wroclaw (Poland); P. Biecek, Politechnika Wroclawska (Poland); M. Kula, Univ. of Wroclaw (Poland) . . . . . [6602-20]

14.45: **Pandemics and immune memory in the noisy Penna model,** S. Cebrat, P. Biecek, K. Bonkowska, Univ. of Wroclaw (Poland) . [6602-21]

SESSION 7

Room: Bolognese . . . . . Tues. 15.00 to 18.05

Noise Effects and Stochastic Resonance

Chair: **Gleb Oshanin**, Univ. Paris VI (France)

15.00: **Coherence resonance in an autapse neuron model with time delay *(Invited Paper)*,** J. Kurths, Univ. Potsdam (Germany) . . [6602-22]

15.30: **Optimal coding of a random stimulus by a population of parallel neuron models *(Invited Paper)*,** M. D. McDonnell, The Univ. of Adelaide (Australia); N. G. Stocks, The Univ. of Warwick (United Kingdom) . . . . . [6602-23]

Coffee Break . . . . . 16.00 to 16.20

16.20: **Pooling networks for a discrimination task: noise-enhanced detection *(Invited Paper)*,** P. Amblard, S. Zozor, Ecole Nationale Supérieure d'Ingénieurs Electriciens de Grenoble (France); M. D. McDonnell, The Univ. of Adelaide (Australia) . . . . . [6602-24]

16.50: **Endogenous neural noise and stochastic resonance *(Invited Paper)*,** L. L. Emberson, Cornell Univ. (USA); K. Kitajo, The Institute of Physical and Chemical Research (RIKEN) (Japan); L. M. Ward, The Univ. of British Columbia (Canada) . . . . . [6602-25]

17.20: **Stochastic beamforming for cochlear implant coding *(Invited Paper)*,** R. P. Morse, Aston Univ. (United Kingdom); B. V. Shulgin, A. P. Nikitin, N. G. Stocks, Univ. of Warwick (United Kingdom) . . . . [6602-26]

17.50: **Fluctuation in the retina: noise-enhanced processing via random sampling and microsaccads,** S. Zozor, P. Amblard, C. Duchene, Ecole Nationale Supérieure d'Ingénieurs Electriciens de Grenoble (France) . . . . . [6602-27]

✔ Posters-Tuesday

Posters will be on display in the conference room on Tuesday. Authors should affix their poster with the material provided in the designated area under their poster number during the morning coffee break. Posters not removed at the end of the day will be considered unwanted and discarded.

✔ **The Mumford-Shah segmentation method for noise reduction and edge detection on corneal topography (videokeratography) images,** L. A. Carvalho, O. M. Bruno, J. B. Florindo, Univ. de São Paulo (Brazil) . . . . . [6602-45]

✔ **Moment neuronal networks: stochastic computation in neuronal systems,** J. Feng, Univ. of Warwick (United Kingdom); Y. Deng, Hunan Univ. (China); E. Rossoni, Univ. of Warwick (United Kingdom) [6602-46]

✔ **Suppression of global oscillation via time-delayed feedback in a net of neural elements,** M. Gassel, E. Glatt, F. Kaiser, Technische Univ. Darmstadt (Germany) . . . . . [6602-47]

✔ **Interplay of noise and variability in subexcitable media,** E. Glatt, M. Gassel, F. Kaiser, Technische Univ. Darmstadt (Germany) . . [6602-48]

Debate Session

Room: Cipressi . . . . . 18.15 to 19.45

Stochastic Resonance—Trivial or Not?

Chair: **Derek Abbott,** The Univ. of Adelaide (Australia)

Join us for a lively debate. Two teams holding opposing views will debate the topic.

Banquet

Room: Limonaia . . . . . 20.00 to 21.30

The History of Noise: The Scandals

Banquet Presenter: **Leon Cohen,** Hunter College/CUNY (USA)

Wednesday 23 May

SESSION P3: Plenary Session III

Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

Room: Cipressi . . . . . Wed. 08.30 to 10.00

08.30: **Thermal noise informatics: totally secure communication via a wire, zero-power communication, and thermal noise driven computing** *(Invited Paper)*, L. B. Kish, Texas A&M Univ. (USA) . . . . . [6600-501]

09.15: **On the relationship between the Langevin equation and stochasticity of the LMS algorithm** *(Invited Paper)*, S. Haykin, McMaster Univ. (Canada) . . . . . [6601-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 8

Room: Bolognese . . . . . Wed. 10.30 to 11.10

Keynote Session

Chair: **Ewa Gudowska-Nowak**, Jagiellonian Univ. (Poland)

Keynote

10.30: **Nonmarkovian noises in biophysical systems *(Invited Paper)*,** I. M. Sokolov, Humboldt-Univ. zu Berlin (Germany) . . . . . [6602-28]

SESSION 9

Room: Bolognese . . . . . Wed. 11.10 to 12.40

Cardiovascular Systems I

Chair: **Jürgen Kurths**, Univ. Potsdam (Germany)

11.10: **Coping with problems in inference of causality from time series *(Invited Paper)*,** M. Palus, M. Vejmelka, Institute of Computer Science (Czech Republic) . . . . . [6602-29]

11.40: **Low frequency noise and cardiorespiratory synchronization *(Invited Paper)*,** A. Bahraminasab, D. A. Kenwright, A. Stefanovska, P. V. E. McClintock, Lancaster Univ. (United Kingdom) . . . . . [6602-30]

12.10: **Fluctuations in a coupled oscillators model of the cardiovascular system *(Invited Paper)*,** J. A. Gonzalez, Instituto Venezolano de Investigaciones Científicas (Venezuela); J. J. Suárez Vargas, A. Stefanovska, P. V. E. McClintock, Lancaster Univ. (United Kingdom) . . . . . [6602-31]

Lunch Break . . . . . 12.40 to 14.00

SESSION 10

Room: Bolognese . . . . . Wed. 14.00 to 15.15

Cardiovascular Systems II

Chair: **Jürgen Kurths**, Univ. Potsdam (Germany)

14.00: **A simple model for 1/f spectra in heart rate variability *(Invited Paper)*,** J. P. Gleeson, National Univ. of Ireland/Cork (Ireland); A. Stefanovska, Lancaster Univ. (United Kingdom) . . . . . [6602-32]

14.30: **Phenomenological analysis of medical time series with regular and chaotic components,** S. F. Timashev, Karpov Institute of Physical Chemistry (Russia); Y. S. Polyakov, USPolyResearch (USA) . . [6602-33]

14.45: **Noisy unmaskers of multistability of periodic rhythms in a model of the ventricular cardiac action potential,** E. D. Surovyatkina, Space Research Institute (Russia) . . . . . [6602-34]

15.00: **Criteria for scaling dissymmetry of physiological fluctuations as a tool for identifying normal and pathological regimes of homeostatic adaptation,** N. Muzalevskaya, St.-Petersburg State Polytechnical Univ. (Russia); V. Uritsky, Univ. of Calgary (Canada) . . . . . [6602-35]

SESSION 11

Room: Bolognese . . . . . Wed. 15.15 to 17.20

Brain and Neuronal Networks

Chair: **Igor M. Sokolov**, Humboldt-Univ. zu Berlin (Germany)

15.15: **Complexity, information loss and model building: from neuro- to cognitive dynamics *(Invited Paper)*,** T. F. Arecchi, Univ. degli Studi di Firenze (Italy) . . . . . [6602-36]

15.45: **Living ordered neural networks as model systems for signal processing *(Invited Paper)*,** C. Villard, Ctr. National de la Recherche Scientifique (France); P. Amblard, G. Beck, Ecole Nationale Supérieure d'Ingénieurs Electriciens de Grenoble (France); S. Gory-Fauré, Commissariat à l'Energie Atomique (France); S. Roth, Ctr. National de la Recherche Scientifique (France) . . . . . [6602-37]

Coffee Break . . . . . 16.15 to 16.35

16.35: **Co-operativity in neurons and the role of noise in brain,** S. Roy, George Mason Univ. (USA); I. Mitra, Georgia State Univ. (USA) [6602-38]

16.50: **Fluctuations and noise in the brain can identify photosensitive epilepsy via strong memory in time series of human magnetoencephalograms,** R. M. Yulmetyev, Kazan State Univ. (Russia) . . . . . [6602-39]

17.05: **Physical/physiological significance of frequency modulation in brain wave with/without photostimulation,** H. Konno, Univ. of Tsukuba (Japan) . . . . . [6602-40]

SESSION 12

Room: Bolognese . . . . . Wed. 17.20 to 18.05

Neuronal Networks

Chair: **Miguel Rubi**, Univ. de Barcelona (Spain)

17.20: **Coherence effects in the response of neuronal models induced by correlations *(Invited Paper)*,** A. Torcini, T. Kreuz, Consiglio Nazionale delle Ricerche (Italy) . . . . . [6602-41]

17.50: **Bayesian inferential framework for diagnostic of non-stationary systems,** V. N. Smelyanskiy, D. G. Luchinsky, NASA Ames Research Ctr. (USA); A. Duggento, P. V. E. McClintock, Lancaster Univ. (United Kingdom) . . . . . [6602-42]

SESSION 13

Room: Bolognese . . . . . Wed. 18.05 to 18.50

Evolution: Genetics

Chair: **Jose Vilar**, Memorial Sloan-Kettering Cancer Ctr. (USA)

18.05: **Stochastic simulations of proto-cell models *(Invited Paper)*,** F. Mavelli, Univ. degli Studi di Bari (Italy) . . . . . [6602-43]

18.35: **Inferring transcriptional noise using protein dipole statistics,** P. Lio, Univ. of Cambridge (United Kingdom) . . . . . [6602-44]

Monday-Thursday 21-24 May 2007 • Proceedings of SPIE Vol. 6603

Noise and Fluctuations in Photonics, Quantum Optics, and Communications

Conference Chair: **Leon Cohen**, Hunter College/CUNY (USA)

Cochairs: **Hai-Woong Lee**, Korea Advanced Institute of Science and Technology (South Korea); **Langford B. White**, The Univ. of Adelaide (Australia); **M. Suhail Zubairy**, Texas A&M Univ. (USA)

Program Committee: **Gabriel Cristóbal**, Consejo Superior de Investigaciones Científicas (Spain); **Luiz Davidovich**, Univ. Federal do Rio de Janeiro (Brazil); **Lorenzo Galleani**, Politecnico di Torino (Italy); **Alfred Hanssen**, Univ. of Troms (Norway); **Simon Haykin**, McMaster Univ. (Canada); **Juan Muga**, Univ. del País Vasco (Spain); **Robert F. O'Connell**, Louisiana State Univ. (USA); **Athina P. Petropulu**, Drexel Univ. (USA); **Bernard Picinbono**, Univ. Paris-Sud II (France); **S. Unnikrishna Pillai**, Polytechnic Univ. (USA); **Barry C. Sanders**, Univ. of Calgary (Canada); **Wolfgang P. Schleich**, Univ. Ulm (Germany); **Selim Shehriar**, Northwestern Univ. (USA); **Patrizia Tavella**, Istituto Nazionale di Ricerca Metrologica (Italy); **Hisashi Yoshida**, Kinki Univ. (Japan); **Shi-Yao Zhu**, Hong Kong Baptist Univ. (Hong Kong China)

Monday 21 May

SESSION P1: Plenary Session I

Chair: **Leon Cohen**, Hunter College/CUNY (USA)

Room: Limonaia . . . . . Mon. 08.20 to 10.00

Welcome and Introduction . . . . . 08.20 to 08.30

08.30: **Answering open questions in the Bose-Einstein condensation of ideal and interacting Bose gases via a hybrid mixture of laser and statistical physics** *(Invited Paper)*, M. O. Scully, Texas A&M Univ. (USA) and Princeton Univ. (USA); V. V. Kocharovsky, Texas A&M Univ. (USA); V. V. Kocharovsky, Institute of Applied Physics (Russia); A. A. Svidzinsky, M. S. Zubairy, Texas A&M Univ. (USA) . . . . . [6603-500]

09.15: **The ever-fluctuating protein** *(Invited Paper)*, J. Klafter, Tel Aviv Univ. (Israel); O. Flomenbom, Massachusetts Institute of Technology (USA); R. Granek, Ben-Gurion Univ. of the Negev (Israel) . [6602-500]

Coffee Break . . . . . 10.00 to 10.30

SESSION 1

Room: Cipressi . . . . . Mon. 10.30 to 12.30

Special Session: Novel Quantum Optics

Chair: **M. Suhail Zubairy**, Texas A&M Univ. (USA)

10.30: **Blackbody radiation: Rosetta stone of heat bath models** ***(Invited Paper)*****,** R. F. O'Connell, Louisiana State Univ. (USA) . [6603-01]

10.50: **Vacuum fluctuations and nuclear quantum optics in strong laser pulses** ***(Invited Paper)*****,** C. H. Keitel, A. Di Piazza, K. Z. Hatsagortsyan, T. J. Bürvenich, J. Evers, Max-Planck-Institut für Kernphysik (Germany) . . . . . [6603-02]

11.10: **Two-frequency Ramsey interferometry** ***(Invited Paper)*****,** J. G. Muga, D. Seidel, I. Lizuain, Univ. del País Vasco (Spain) . . . . . [6603-04]

11.30: **Quantum pulse compression laser radar** ***(Invited Paper)*****,** J. H. Shapiro, Massachusetts Institute of Technology (USA) . . . . . [6603-05]

11.50: **Suppressing noise in single-molecule imaging using quantum optics** ***(Invited Paper)*****,** P. R. Hemmer, Texas A&M Univ. (USA) [6603-06]

12.10: **Sensitivity, bandwidth and SNR constraints in fast-light enhanced precision metrology for applications to rotation sensing and gravity wave detection** ***(Invited Paper)*****,** S. M. Shahriar, G. Pati, M. Messal, K. Salit, Northwestern Univ. (USA) . . . . . [6603-07]

Lunch Break . . . . . 12.30 to 14.20

SESSION 2

Room: Cipressi . . . . . Mon. 14.20 to 18.00

Special Session: Nonstationary Noise

Chair: **Lorenzo Galleani**, Politecnico di Torino (Italy)

14.20: **Characterization of non-stationary interference signals in GNSS applications** ***(Invited Paper)*****,** L. Lo Presti, B. Motella, Politecnico di Torino (Italy) . . . . . [6603-08]

14.40: **Noisy oscillator: theory and applications,** M. Gitterman, Bar-Ilan Univ. (Israel) . . . . . [6603-09]

15.00: **Transient analysis of random systems** ***(Invited Paper)*****,** L. Galleani, Politecnico di Torino (Italy) . . . . . [6603-10]

15.20: **Detection and estimation of weak signals in time varying noise and interference** ***(Invited Paper)*****,** D. J. Nelson, U.S. Department of Defense (USA) . . . . . [6603-11]

15.40: **Initial conditions problems in the fractional order equations: wave and stochastic processes in disordered systems,** V. E. Arkhincheev, Buryat State Univ. (Russia) and Federal Urdu Univ. of Arts, Sciences and Technology (Pakistan) . . . . . [6603-12]

Coffee Break . . . . . 16.00 to 16.20

16.20: **Generalized Rényi image entropy: a new noise measure** ***(Invited Paper)*****,** G. Cristóbal, S. Gabarda, Consejo Superior de Investigaciones Científicas (Spain) . . . . . [6603-13]

16.40: **Statistical study of the inverse first passage time algorithm** ***(Invited Paper)*****,** C. Zucca, L. Sacerdote, Univ. degli Studi di Torino (Italy) [6603-14]

17.00: **Colored-noise-induced coupling of overdamped bistable oscillators,** Y. V. Gudyma, O. M. Semenko, Yuriy Fedkovych Chernivtsi National Univ. (Ukraine) . . . . . [6603-15]

17.20: **Noise-induced critical phenomena: a case study,** G. Nunnari, Univ. degli Studi di Catania (Italy); G. Puglisi, Istituto Nazionale di Geofisica e Vulcanologia (Italy); F. Cannavo, A. Spata, Univ. degli Studi di Catania (Italy) . . . . . [6603-16]

17.40: **Impact of non-stationary noise on xDSL systems: an experimental analysis,** L. Vilar de Souza, J. C. W. A. Costa, C. R. Francês, A. L. S. Castro, G. P. d. S. Cavalcante, Univ. Federal do Pará (Brazil); J. Rius i Riu, Ericsson (Sweden) . . . . . [6603-17]

Tuesday 22 May

SESSION P2: Plenary Session II

Chair: **János Kertész**, Budapest Univ. of Technology and Economics (Hungary)

Room: Cipressi . . . . . Tues. 08.30 to 10.00

08.30: **Origins of randomness in statistical and quantum mechanics** *(Invited Paper)*, M. B. Weissman, Univ. of Illinois at Urbana-Champaign (USA) . . . . . [6600-500]

09.15: **Quantum physics and number theory** *(Invited Paper, Presentation Only)*, W. P. Schleich, Univ. Ulm (Germany) . . [6603-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 3

Room: Cipressi . . . . . Tues. 10.30 to 12.50

Special Session: Quantum Walks and Noise

Chair: **Langford B. White**, The Univ. of Adelaide (Australia)

10.30: **Quantum walks, automata and structured search *(Invited Paper)*,** S. Naguleswaran, L. B. White, Univ. of Adelaide (Australia); I. Fuss, Defence Science and Technology Organisation (USA) . . [6603-18]

10.50: **Analytic views of quantum walks *(Invited Paper)*,** I. Fuss, Defence Science and Technology Organisation (Australia); P. J. Sherman, Iowa State Univ. (USA); L. B. White, S. Naguleswaran, Univ. of Adelaide (Australia) . . . . . [6603-19]

11.10: **Quantum anharmonic oscillator and its statistical properties,** M. M. Duras, Politechnika Krakowska (Poland) . . . . . [6603-20]

11.30: **Deterministic purity evolution via weak measurement for bipartite quantum systems,** C. D. Hill, J. F. Ralph, The Univ. of Liverpool (United Kingdom) . . . . . [6603-21]

11.50: **SU(1,1) and SU(2) Fokker-Planck equations and its steady state solutions,** N. A. Enaki, Institute of Applied Physics of Academy of Sciences of Moldova (Moldova) . . . . . [6603-22]

12.10: **A probabilistic argument for quantum games,** A. Iqbal, T. Cheon, Kochi Univ. of Technology (Japan) . . . . . [6603-23]

12.30: **The Hadamard quantum random walk as an initial condition problem to obtain momentum asymptotics *(Invited Paper)*,** P. J. Sherman, Iowa State Univ. (USA); L. B. White, I. G. Fuss, The Univ. of Adelaide (Australia) . . . . . [6603-24]

Lunch Break . . . . . 12.50 to 14.20

SESSION 4

Room: Cipressi . . . . . Tues. 14.20 to 16.00

Special Session: FaN in Atomic Clock Applications

Chair: **Patrizia Tavella**, Istituto Nazionale di Ricerca Metrologica (Italy)

14.20: **The statistics of the Global Positioning System *(Invited Paper)*,** D. Matsakis, U.S. Naval Observatory (USA) . . . . . [6603-25]

14.40: **Impact of atomic clock noises in the formation of the International Atomic Time *(Invited Paper)*,** W. Lewandowski, Bureau International des Poids et Mesures (France) . . . . . [6603-26]

15.00: **Roles of noise in reliability problems: the view point of a mathematician and some application proposals *(Invited Paper)*,** L. Sacerdote, Univ. degli Studi di Torino (Italy) . . . . . [6603-27]

15.20: **Characterization of nonstationary atomic clocks *(Invited Paper)*,** L. Galleani, Politecnico di Torino (Italy); P. Tavella, Istituto Nazionale di Ricerca Metrologica (Italy) . . . . . [6603-28]

15.40: **The generalized likelihood ratio test for detecting anomalous behaviors of atomic clocks *(Invited Paper)*,** E. Nunzi, P. Carbone, Univ. degli Studi di Perugia (Italy) . . . . . [6603-29]

Coffee Break . . . . . 16.00 to 16.20

SESSION 5

Room: Cipressi . . . . . Tues. 16.20 to 18.00

Special Session: Timing Noise in High-Energy Astronomy

Chair: **Tomaso M. Belloni**, Osservatorio Astronomico di Brera (Italy)

16.20: **Noise components from black-hole binaries in our Galaxy *(Invited Paper)*,** T. M. Belloni, Osservatorio Astronomico di Brera (Italy) . . . . . [6603-30]

16.40: **Millisecond phenomena in mass accreting neutron stars *(Invited Paper)*,** M. van der Klis, Univ. van Amsterdam (Netherlands) . . . . . [6603-31]

17.00: **Timing the X-ray fluctuations from supermassive black holes *(Invited Paper)*,** P. Uttley, Univ. of Southampton (United Kingdom) . . . . . [6603-32]

17.20: **Studying accreting black holes and neutron stars with time series: beyond the power spectrum *(Invited Paper)*,** S. Vaughan, Univ. of Leicester (United Kingdom) . . . . . [6603-33]

17.40: **Time-varying spectral analysis of astronomical time series *(Invited Paper)*,** L. Galleani, Politecnico di Torino (Italy); L. Cohen, Hunter College/CUNY (USA); D. J. Nelson, U.S. Dept. of Defense (USA); T. M. Belloni, Osservatorio Astronomico di Brera (Italy) . . . . . [6603-34]

✔ Posters-Tuesday

Posters will be on display in the conference room on Tuesday. Authors should affix their poster with the material provided in the designated area under their poster number during the morning coffee break. Posters not removed at the end of the day will be considered unwanted and discarded.

✔ **Pump to signal and pump to ASE noise correlations in co-propagative Raman amplifiers,** C. Chluda, M. Myara, L. Troussellier, J. Perez, P. Signoret, B. P. Orsal, Univ. Montpellier II (France) [6603-63]

✔ **Stochastic resonance in photonic crystal growth,** A. Amann, W. Khunsin, G. Kocher, C. M. Sotomayor Torres, E. P. O'Reilly, Tyndall National Institute (Ireland) . . . . . [6603-64]

✔ **Noise in atomic force spectroscopy of images,** P. S. Timashev, Institute of Laser and Information Technologies (Russia); N. A. Aksenova, A. B. Solovieva, N.N. Semenov Institute of Chemical Physics (Russia) . . . . . [6603-65]

✔ **Removal of water-vapor-induced fluctuations in T-ray signals: a preliminary study,** W. Withayachumnankul, B. M. Fischer, S. P. Mickan, D. Abbott, The Univ. of Adelaide (Australia) . . . . . [6603-66]

✔ **Experimental demonstration of impact of amplified spontaneous emission noise on devices based on cross-gain modulation in semiconductor optical amplifiers,** B. S. Gopalakrishna Pillai, K. L. Lee, A. Nirmalathas, The Univ. of Melbourne (Australia); M. Premaratne, Monash Univ. (Australia); C. Lim, The Univ. of Melbourne (Australia) . . . . . [6603-67]

✔ **Study of noise in fiber optical parametric amplifiers,** R. Farhoudi, Univ. of Tehran (Iran) . . . . . [6603-68]

✔ **Monte Carlo simulations of non-Markovian open systems,** J. Piilo, S. Maniscalco, K. Suominen, Univ. of Turku (Finland) . . . . . [6603-70]

✔ **Observation of radiation-pressure effects and back-action cancellation in interferometric measurements,** T. Briant, T. Caniard, P. Verlot, P. Cohadon, M. Pinard, A. Heidmann, Univ. Pierre et Marie Curie (France) . . . . . [6603-71]

✔ **The joint distribution of detected neutrons and gamma photons from fissile samples and its application in nuclear safeguards,** I. Pazsit, Chalmers Tekniska Hoegskola (Sweden); L. Pál, KFKI Atomic Energy Research Institute (Hungary); A. Enqvist, Chalmers Tekniska Hoegskola (Sweden); S. A. Pozzi, Oak Ridge National Lab. (USA) . . . . . [6603-73]

✔ **Effects of stray illumination noise on position resolution of position-sensitive devices,** S. Iqbal, International I Univ. (Pakistan); M. M. S. Gualini, Federal Urdu Univ. of Arts, Sciences and Technology (Pakistan) . . . . . [6603-74]

✔ **Repetitive single amplified high intensity ultra-short pulse laser system,** J. Chen, Chung-Hua Univ. (Taiwan) . . . . . [6603-75]

✔ **Intensity noise of ultrabroadband quantum dot light emitting diodes at 1.3 μm,** M. Blazek, S. Breuer, T. Gensty, W. E. Elsässer, Technische Univ. Darmstadt (Germany); M. Hopkinson, K. M. Groom, The Univ. of Sheffield (United Kingdom); M. Calligaro, P. Resneau, M. Krakowski, Thales Research & Technology (France) . . . . . [6603-76]

✔ **In-service and in real-time optical channel performance analysis with combined noise and jitter,** S. V. Kartalopoulos, Sr., Univ. of Oklahoma (USA) . . . . . [6603-77]

✔ **Echo-based averaging of scattered light intensity fluctuations,** P. Zakharov, F. Scheffold, Univ. de Fribourg (Switzerland) . . . . [6603-78]

✔ **Model based reduction of nonstationary noise for single channel speech communication systems,** R. M. Nickel, X. Xiao, The Pennsylvania State Univ. (USA) . . . . . [6603-95]

Debate Session

Room: Cipressi . . . . . 18.15 to 19.45

Stochastic Resonance—Trivial or Not?

Chair: **Derek Abbott,** The Univ. of Adelaide (Australia)

Join us for a lively debate. Two teams holding opposing views will debate the topic.

Banquet

Room: Limonaia . . . . . 20.00 to 21.30

The History of Noise: The Scandals

Banquet Presenter: **Leon Cohen,** Hunter College/CUNY (USA)

Wednesday 23 May

SESSION P3: Plenary Session III

Chair: **Sergey M. Bezrukov**, National Institutes of Health (USA)

Room: Cipressi . . . . . Wed. 08.30 to 10.00

08.30: **Thermal noise informatics: totally secure communication via a wire, zero-power communication, and thermal noise driven computing** *(Invited Paper)*, L. B. Kish, Texas A&M Univ. (USA) . . . . . [6600-501]

09.15: **On the relationship between the Langevin equation and stochasticity of the LMS algorithm** *(Invited Paper)*, S. Haykin, McMaster Univ. (Canada) . . . . . [6601-501]

Coffee Break . . . . . 10.00 to 10.30

SESSION 6

Room: Cipressi . . . . . Wed. 10.30 to 13.10

Special Session: Quantum Entanglement

Chair: **Luiz Davidovich**, Univ. Federal do Rio de Janeiro (Brazil)

10.30: **Quantum sensors *(Invited Paper)*,** J. P. Dowling, Louisiana State Univ. (USA) . . . . . [6603-35]

10.50: **Multi-partite entangled Gaussian states and su(1,1) symmetry *(Invited Paper)*,** B. C. Sanders, Z. Shaterzadeh Yazdi, P. S. Turner, Univ. of Calgary (Canada) . . . . . [6603-36]

11.10: **Experimental observation of environment-induced sudden disappearance of entanglement *(Invited Paper)*,** L. Davidovich, M. P. Almeida, F. de Melo, M. O. Hor-Meyll, A. Salles, S. P. Walborn, P. H. S. Ribeiro, Univ. Federal do Rio de Janeiro (Brazil) . . . . . [6603-37]

11.30: **Quantum entanglement: measures and applications *(Invited Paper),*** M. S. Zubairy, Texas A&M Univ. (USA) . . . . . [6603-38]

11.50: **Quantum and correlated imaging *(Invited Paper)*,** A. C. Gatti, E. Brambilla, O. Jedrkiewicz, L. A. Lugiato, Univ. degli Studi dell'Insubria (Italy) . . . . . [6603-39]

12.10: **Entanglement and noise in the above-threshold optical parametric oscillator *(Invited Paper)*,** P. A. Nussenzveig, K. N. Cassemiro, A. S. Villar, P. Valente, M. Martinelli, Univ. de Sao Paulo (Brazil) . . . . . [6603-40]

12.30: **Decoherence free subspace and entanglement in squeezed bath *(Invited Paper)*,** M. Orszag, Pontificia Univ. Católica de Chile (Chile); D. Mundarain, Univ. Simon Bolivar (Venezuela) . . . . . [6603-41]

12.50: **Entanglement in macroscopic optomechanical systems,** D. Vitali, Univ. degli Studi di Camerino (Italy) . . . . . [6603-42]

Lunch Break . . . . . 13.10 to 14.30

SESSION 7

Room: Cipressi . . . . . Wed. 14.30 to 16.10

Special Session: Quantum Coherence

Chair: **Hai-Woong Lee**, Korea Advanced Institute of Science and Technology (South Korea)

14.30: **Effect of spontaneous decay on the atomic Rabi oscillation *(Invited Paper)*,** H. Lee, S. K. Lee, B. G. Kim, Korea Advanced Institute of Science and Technology (South Korea) . . . . . [6603-43]

14.50: **Quantum interference in light scattering and propagation *(Invited Paper)*,** J. Evers, M. Macovei, Max-Planck-Institut für Kernphysik (Germany); M. Mahmoudi, Zanjan Univ. (Iran); C. H. Keitel, Max-Planck-Institut für Kernphysik (Germany) . . . . . [6603-44]

15.10: **Localization of a small collection of fluorescing atoms *(Invited Paper)*,** M. Macovei, J. Evers, C. H. Keitel, Max-Planck-Institut für Kernphysik (Germany); M. S. Zubairy, Texas A&M Univ. (USA) [6603-87]

15.30: **Nonlinear magneto-optic polarization rotation with intense laser fields *(Invited Paper)*,** G. R. Welch, P. S. Hsu, A. K. Patnaik, Texas A&M Univ. (USA) . . . . . [6603-45]

15.50: **Spontaneous emission inhibition in a left-handed material *(Invited Paper)*,** S. Zhu, Hong Kong Baptist Univ. (Hong Kong China) . . . . . [6603-48]

Coffee Break . . . . . 16.10 to 16.30

SESSION 8

Room: Cipressi . . . . . Wed. 16.30 to 18.10

Noise in Fibers

Chair: **Douglas J. Nelson**, U.S. Dept. of Defense (USA)

16.20: **Noise and jitter behavior of nonlinear amplifier optical loop mirror based on photonic crystal fibers,** C. de Dios Fernández, H. Lamela Rivera, Univ. Carlos III de Madrid (Spain) . . . . . [6603-49]

16.40: **Comparative splice loss analysis of dispersion-shifted and dispersion-flattened single-mode fibers,** C. M. Jadhao, G.S. College of Khamgaon (India); D. S. Dhote, Brijlal Biyani Science College of Amravati (India) . . . . . [6603-50]

17.00: **Video duality measurements in optical fiber links,** K. Nasiri, R. Ebrahimpur, Shahid Rajaei Univ. (Iran) . . . . . [6603-51]

17.20: **Estimation of channel performance with fast reassignment and equalization assisted by supercontinuum sources,** S. V. Kartalopoulos, Sr., Univ. of Oklahoma (USA) . . . . . [6603-52]

17.40: **Analysis of intrinsic perturbation by thermal stress birefringence,** D. S. Dhote, Brijlal Biyani Science College of Amravati (India); C. M. Jadhao, G.S. College of Khamgaon (India) . . . . . [6603-53]

✔ Posters-Wednesday

Posters will be on display in the conference room on Wednesday. Authors should affix their poster with the material provided in the designated area under their poster number during the morning coffee break. Posters not removed at the end of the day will be considered unwanted and discarded.

✔ **Nonlinear decomposition-and-denoising approach for removal of signal-dependent noise of a digital color camera,** T. Saito, Y. Ishii, T. Komatsu, Kanagawa Univ. (Japan) . . . . . [6603-79]

✔ **Fluctuation reduction in a rational harmonic mode-locked fiber ring laser using carrier-suppressed return-to-zero modulation format,** S. Yamanaka, J. Maeda, Tokyo Univ. of Science (Japan) . . . . . [6603-80]

✔ **Excess noise sources in depolarized Raman pumping system,** C. Chluda, M. Myara, L. Troussellier, J. Perez, P. Signoret, B. P. Orsal, Univ. Montpellier II (France) . . . . . [6603-81]

✔ **Optical regeneration based in noise generated in bistable devices: going from 2R to 3R,** A. P. Gonzalez-Marcos, T. Vivero, J. A. Martin-Pereda, Univ. Politécnica de Madrid (Spain) . . . . . [6603-82]

✔ **Coherence resonance in a time-delayed bistable system,** K. P. Panajotov, Vrije Univ. Brussel (Belgium); M. Arizaleta Arteaga, Univ. Pública de Navarra (Spain); M. Valencia, Vrije Univ. Brussel (Belgium); M. Sciamanna, Supélec (France); M. Lopez-Amo, Univ. Pública de Navarra (Spain); H. Thienpont, Vrije Univ. Brussel (Belgium) [6603-83]

✔ **Image denoising based on a mixture of bivariate Laplacian distributions with local parameters in complex wavelet domain,** H. Rabbani, M. Vafadust, Amirkabir Univ. of Technology (Iran) . [6603-84]

✔ **Analysis of optical mixing in RF modulated noisy optical links,** M. R. Salehi, Shiraz Univ. (Iran) . . . . . [6603-85]

✔ **Quantum optics with a micro-mechanical resonator,** P. Cohadon, O. Arcizet, C. Molinelli, T. Briant, M. Pinard, A. Heidmann, Univ. Pierre et Marie Curie (France) . . . . . [6603-88]

✔ **Effect of transverse electric wave for optical resonance in dielectric microspheres,** A. Rahman, S. Kumar, Polytechnic Univ. (USA) . . . . . [6603-89]

✔ **M:N phase synchronization of Iff in an chaotic ECSL system,** M. Bulinski, Univ. of Bucharest (Romania); C. Ticos, Los Alamos National Lab. (USA); A. Relu, National Institute for Lasers, Plasma and Radiation Physics (Romania) . . . . . [6603-90]

✔ **Highly-sensitive measurement technique of relative intensity noise and laser characterization,** J. Poette, P. Besnard, L. Bramerie, J. Simon, Ecole Nationale Supérieure des Sciences Appliquées et de Technologie (France) . . . . . [6603-92]

✔ **Entropic noise in formation of the peptide bond *(Invited Paper)*,** L. Massa, Hunter College/CUNY (USA) . . . . . [6603-94]

Thursday 24 May

SESSION P4: Plenary Session IV

Chair: **Massimo Macucci**, Univ. di Pisa (Italy)

Room: Cipressi . . . . . Thurs. 08.30 to 10.00

08.30: **Exercising demons: quantum Brownian motors** *(Invited Paper)*, P. Hänggi, Univ. Augsburg (Germany) . . . . . [6602-501]

09.15: **A biomimetic approach to signal coding: suprathreshold stochastic resonance with applications** *(Invited Paper, Presentation Only)*, N. G. Stocks, A. P. Nikitin, B. V. Shulgin, Univ. of Warwick (United Kingdom); R. P. Morse, Aston Univ. (United Kingdom); M. D. McDonnell, D. Abbott, The Univ. of Adelaide (Australia) . . [6600-502]

Coffee Break . . . . . 10.00 to 10.30

Sessions 9 and 10 run concurrently.

SESSION 9

Room: Cipressi . . . . . Thurs. 10.30 to 12.10

Noise in Devices

Chair: **Gabriel Cristóbal**, Consejo Superior de Investigaciones Científicas (Spain)

10.30: **Accurate excess photodetection noise measurements in Raman amplifiers,** C. Chluda, M. Myara, P. Signoret, L. Troussellier, B. P. Orsal, Univ. Montpellier II (France) . . . . . [6603-54]

10.50: **Effect of intensity noise on modulation performance of semiconductor lasers in digital communication systems,** M. F. Ahmed, Al-Margib Univ. (Libya); M. Yamada, Kanazawa Univ. (Japan) . . . . . [6603-55]

11.10: **Complex dynamics observed in the noise spectrum of lateral coupled diode lasers,** H. Lamela Rivera, R. Santos, Univ. Carlos III de Madrid (Spain) . . . . . [6603-56]

11.30: **Intensity fluctuations of focused general-type beams in atmospheric optics links,** Y. K. Baykal, H. T. Eyyuboglu, Cankaya Univ. (Turkey) . . . . . [6603-57]

11.50: **Zeno and anti-Zeno effects for quantum Brownian motion,** S. Maniscalco, J. Piilo, K. Suominen, Turun Yliopisto (Finland) . . [6603-58]

SESSION 10

Room: Bolognese . . . . . Thurs. 10.30 to 11.50

Quantum Noise

Chair: **Lorenzo Galleani**, Politecnico di Torino (Italy)

10.30: **Breakdown of the few-level approximation in dipole-dipole interacting systems,** M. Kiffner, J. Evers, C. H. Keitel, Max-Planck-Institut für Kernphysik (Germany) . . . . . [6603-59]

10.50: **High-sensitivity imaging with quantum spatial correlation of PDC beams,** A. C. Gatti, Univ. degli Studi dell'Insubria (Italy) and CNR-CNISM (Italy); L. Caspani, E. Brambilla, L. A. Lugiato, O. Jedrkiewicz, Univ. degli Studi dell'Insubria (Italy) . . . . . [6603-60]

11.10: **Impact of noise on the polarization switching of VCSELs,** C. Masoller, Univ. Politecnica de Cataluña (Spain) . . . . . [6603-61]

11.30: **Effect of noise in quantum communications,** S. V. Kartalopoulos, Sr., Univ. of Oklahoma (USA) . . . . . [6603-62]

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Fourth SPIE International Symposium on

Fluctuations and Noise

20–24 May 2007
La Pietra International Conference and Events Centre
Florence, Italy

Conference Location

La Pietra International Conference and Events Centre
Via Bolognese, 120, 50139 Florence, ITALY
Tel. +39 055 5007.225 • http://www.nyu.edu/lapietra/home.html

Registration Hours

Location: Ground Floor, Villa Sasetti

Sunday, 20 May . . . . . 15.00 to 18.00 hrs
Monday, 21 May . . . . . 07.00 to 17.00 hrs
Tuesday, 22 May . . . . . 07.30 to 17.00 hrs
Wednesday, 23 May . . . . . 07.30 to 17.00 hrs
Thursday, 24 May . . . . . 08.00 to 11.00 hrs

If you pre-registered for the meeting, you may pick up your conference materials during the above referenced registration hours. Full symposium registration includes: Admittance to the conferences, welcome reception, coffee breaks, hosted lunches, scheduled transfers from city centre, and Proceedings of SPIE as applicable under the specific registration plans (see Registration Form for details). Proceedings of SPIE and CD-ROMs purchased as part of your registration plan include tax and shipping charges and will be shipped 4-6 weeks after the meeting. Student author registration plans do not include Proceedings of SPIE.

Welcome Reception

La Pietra International Conference and Events Centre

Location: Villa La Sasetti Lawn

Sunday, 20 May . . . . . 18.00 to 20.00 hrs

All conference attendees are invited to attend the welcome reception to meet and renew relationships with colleagues. Please complete your registration prior to the reception and remember to wear your name badge.

Coffee Breaks

Location: Villa Sassetti Garden
Coffee with be served during the morning and afternoon breaks. Please check the individual technical conference listings for exact times.

Lunches

Lunches are included in the price of registration and will be served on Monday, Tuesday, and Wednesday. Please remember to wear your name badge.

Banquet

A banquet is planned immediately following the technical conferences on Tuesday. Banquet space is limited. Please reserve your ticket today. Tickets may be purchased during the registration process or at the meeting if space is still available.

Presentation Format

Oral presentation times may vary. Please check the program for the length of your presentation.

Posters will be on display in the conference rooms Tuesday or Wednesday. Check the conference program for the day on which your poster should be displayed. Authors should affix their posters where designated with the material provided by the morning coffee break. Posters not removed at the end day will be considered unwanted and discarded.

Audiovisual Equipment

The meeting room will contain the following audiovisual equipment.

- Podium microphone
- Projection pointer
- Screen
- LCD Projector
- PC Workstation

Audio/Video/Digital Recording Policy

Due to copyright restrictions, strictly no recordings of any kind are permitted without prior written consent of the presenter in any conference session, short course or posters. Consent forms are available at the SPIE Desk and anyone wishing to record must have a written consent form signed and filed for each presenter being recorded. Individuals not complying with this policy will be asked to leave a given session and asked to surrender their film or recording media.

Internet

Internet services will be available in the computer lab.

Messages for Attendees

Messages for attendees at Fluctuations and Noise can be left by calling Tel. +39 055 5007 536. Messages will be taken during registration hours Monday through Thursday. Attendees should check the message boards at the message centre on a daily basis.

SPIE Publications

The SPIE Publications Desk can be found near the Registration Desk on the Ground Floor of Villa Sasetti. It will be open during registration hours.

Coat Check

The coat check area can be found on the Ground Floor behind Reception in the Villa Sassetti. Please check with reception for further details.

Travel Information

Scheduled Transport to and from the La Pietra Centre

A daily coach / bus service will be in operation between the Conference Centre and the City Centre over the conference days. Please refer to the schedule below for times and locations.

Bus Transfer Florence City - Villa La Pietra
Sunday, 20th May 2007
Departure: outside CIT Viaggi (Piazza della Stazione 51R)
Service runs every half hour from 14.30 - 17.30 hrs. Buses will return attendees to the CIT Viaggi at the end of the reception at 20.00 hrs.

Bus Transfer Florence City - Villa La Pietra
Monday - Thursday, 21st to 24th May 2007
NB: on Tuesday, 22nd May, buses will leave for the city of Florence after the banquet at 23.00 hrs.

Alternative Options for Transport to and from the La Pietra Centre

BY CAR: Take highway exit A1-A11 "Firenze Nord-Aereoporto." After exiting follow the signs for "Centro - Porta al Prato." From Porta al Prato, follow the signs to "Viali di Circonvallazione" and "Stadio". The Viali di Circonvallazione will bring you to Piazza della Liberta. From Piazza della Liberta, follow the signs to "Bologna". This will put you on Viale Don Minzoni. Follow Viale Don Minzoni to the first traffic light (corner of Don Minzoni and Via Masaccio), and make a left at the light onto Via Pascoli. Via Pascoli bends and merges with Via Lungo Il Mugnone. Get in the right lane as soon as soon as you merge. Before the first traffic light, make a right turn onto the Via Bolognese. La Pietra is located on Via Bolognese 120 (approximately 1 mile from Piazza della Liberta). There is ample parking on the grounds. To enter the estate, please ring the doorbell labeled "Villa La Pietra." You will see "Parking" signs once you have entered the estate.

BY TRAIN: From the Florence railway station (Santa Maria Novella), located in the city center, you can either take a taxi to La Pietra (journey time is less than 20 minutes) or you can take the ATAF bus no. 25 and get off at the "La Pietra" stop, just beyond the gate of the Villa.

BY TAXI: For Radio taxis: tel. 055-4390 or 055-4242

Bus Number	Staying at Hotel	Address	Shuttle bus pick-up point	Depar-ture AM	Return leaving La Pietra PM	Distance from hotel
1	Palazzo Ognissanti ****	Via Finiguerra, 12	In front of hotel	7.30	Mon 18.45 Tues: 23.00 Wed: 19.10 Thurs: 12.30	n/a
2	Balestri ***	Piazza Mentana, 7	In front of hotel	7.30	Mon: 18.45 Tues: 23.00 Wed 19.10 Thurs: 12.30	n/a
3	De La Pace ***	Via La Marmora, 28	In front of hotel De La Pace	7.30	Mon 18.45 Tues: 23.00 Wed: 19.10 Thurs: 12.30	n/a
	Hotel Palazzo Ricasoli ****	Via delle Mantellate, 2				400 mt
4	Le Due Fontane ***	Piazza della Santissima Annunziata, 14	In front of hotel	7.30	Mon 18.45 Tues: 23.00 Wed: 19.10 Thurs: 12.30	n/a
5	Malaspina ***	Piazza Indipendenza, 24	In Piazza Indipendenza (center of piazza)	7.30	Mon 18.45 Tues: 23.00 Wed: 19.10 Thurs: 12.30	100 mt
	Cellai ***	Via Ventisette Aprile, 14				150 mt
	Rapallo ***	Via Santa Caterina d'Alessandria, 7				170 mt
6	Corona ***	Via Nazionale, 14	At the bus stop in front of Hotel Corona	7.30	Mon 18.45 Tues: 23.00 Wed: 19.10 Thurs: 12.30	n/a
	Sempione ***	Via Nazionale 15				60 mt
	Globus ***	Via San Antonino, 24				250 mt
	Vasari ***	Via Cennini, 11				270 mt

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2. The 15% Discount applies to rentals on Affordable Rates from May 1-30, 2007.
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5. Offer includes Compact and above (manuals and automatics)
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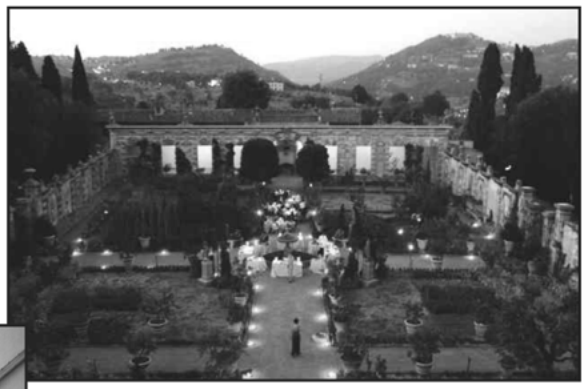
7. Certificate has no cash value and may not be combined with any other offer, discount or promotion. Certificate must be presented and surrendered at time of rental.
8. Normal intercity rules and rate restrictions apply.
9. Minimum rental age is 25 (exceptions apply). Hertz standard driver and credit qualifications for the rental location apply. Blackout periods may apply.

Florence is bursting with classical architectural buildings, spread across the 4 historical districts of Santa Maria Novella, San Giovanni, Santa Croce, and Santo Spirito. Florence boasts one of the highest concentrations of artistic treasures per square mile in the world. With the City Centre covering a small area it can be easily explored on foot, but with so many captivating attractions visitors need to plan to maximise their visit.



As many of the areas of the city centre are closed to private traffic, electric buses provide a fast and efficient public transport route to many of the sites. Bus tickets need to be purchased beforehand from tobacconists, bars, newspaper kiosks, information offices or automatic machines.

The city has a fantastic array of shops including designer names and no visit to Florence would be complete within a visit to the oldest bridge dating back to Roman times - the 'Ponte Vecchio' with its Goldsmith shops. Visitors to the city of Florence can also experience the atmosphere, culture and cuisine through a wide choice of bars, cafes, and restaurants (ristoranti or trattorie). Lastly not forgetting the traditional Italian "gelateria" where delicious ice cream is made on the premises.

Further Tourist Information

Up to date information and advice to visitors can be found through the official tourist board (APT) of Florence. They can provide details of hotels, maps, opening times of museums and current exhibitions.

APT Florence Tourist Office
1 (red) Via Cavour or 29 (red) Borgo Santa Croce
Tel. 055. 290832
www.firenzeturismo.it

Currency

The official monetary unit in Italy is the Euro. All major credit cards are widely accepted in shops, hotels and restaurants. ATM's are known as "Bancomat".

Most of the hotels and restaurants in Florence include a service charge so tipping is less widespread than found in other areas of the world.

Climate

Lying at the feet of the Tuscan-Emilian Apennines not far above sea level provides a continental climate with fairly cold winters and relatively high humidity, during the summer months being July and August, many of the inhabitants of Florence retreat to the nearby hills to cool off. Average annual rainfall is 830 mm.

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