



**ISTITUTO
NAZIONALE
DI RICERCA
METROLOGICA**



Final Program

**3rd International Workshop
ad memoriam of Carlo Novero**



**“Advances in Foundations of Quantum Mechanics and
Quantum Information with atoms and photons”**

2-5 May 2006, Torino

Organizers:

M. Genovese, G. Brida, M.L. Rastello, A. Garuccio

Sponsorships:

**Istituto Nazionale di Ricerca Metrologica, Torino
Università degli Studi di Bari, Dipartimento di Fisica
Università degli Studi di Torino, Dipartimento di Fisica Teorica**

**ISTITUTO NAZIONALE DI RICERCA METROLOGICA (INRI M)
Sala Convegni
Strada delle Cacce, 91
Torino, Italy**

Program

Tuesday 2nd		
09.15-09.30	Welcome to participants of I.N.R.I.M. president E. Bava	
Session I - Chairman: S. Kulik		
09.30-10.00	R. Ionicioiu	Entangling spins by measuring charge
10.00-10.30	P. Voss	Recent advances in optical fiber sources of entanglement
10.30-11.00	I. Degiovanni	Analysis of a multiplexed detector system used to increase photon-counting rates by reducing effective deadtime
11.00-11.30	Coffee break	
Session II - Chairman: A. Garuccio		
11.30-12.00	F. Petruccione	Dynamics of two-qubit systems in a spin star environment
12.00-12.30	M. Bondani	Calculation of the 3D interaction geometry for two interlinked χ^2 processes generating entangled triplets
12.30-13.00	I. Marzoli	Towards a quantum computer with trapped electrons
13.00-13.30	G.S. Agarwal	Detector Induced Quantum Entanglement and its Measurement in Radiation from a Collective System
13.30-13.45	A. Gabris	Quantum teleportation with pair coherent states
13.45-15.00	Lunch	
Session III - Chairman J. O'Brien		
15.00-15.30	G. Brida	Dispersion spreading of biphotons and two-photon interference
15.30-16.00	M. Bellini	Quantum tomography of time-delocalized single photons
16.00-16.30	S. Kulik	Polarization ququarts
16.30-17.00	Coffee break	
Session IV - Chairman: Y. Shih		
17.00-17.30	J. Appel	Routing of optical states by atomic media
17.30-18.00	F.Cataliotti	Magnetic microtraps for quantum control

Wednesday 3th**Session I - Chairman: M. Chekhova**

09.- 9.30	P. Mataloni	Hyper-entangled two photon states for quantum communication applications
9.30 - 10	Y. Kim	Recent progress toward "engineered" entangled-photon states
10.00- 10.30	M. Genovese	On reconstructing photon statistics by on/off detectors: toward multi-partite case
10.30- 11.00	C.Monken	Position and momentum entanglement in two-photon states generated by spontaneous parametric down-conversion
11.00- 11.30	Coffee break and poster session	

Session II - Chairman: G. Bjork

11.30- 12.00	A. Gatti	Coherent imaging of a pure phase object with classical incoherent light
12.00- 12.30	G. DiGiuseppe	Simulation of an Individual Incoherent Eavesdropping on a Two-Way Quantum Communication Protocol
12.30- 12.50	P. Walther	Progress towards generation, storage and manipulation of entangled photons in atomic ensembles
12.50- 13.10	A. Porzio	Homodyne characterisation of cw bipartite states
13.10- 13.30	S. Padua	Generating, distributing and characterizing two-photon entangled spatial qudits
13.30- 13.50	R. Migliore	A simple scheme to entangle uncoupled superconducting qubits via an entanglement mediator
13.50- 15.00	Lunch	
14:40- 15:00	Visit to "Carlo Novero" laboratory	

Session III - Chairman: J. Perina

15.00- 15.15	M. D'Angelo	Is entanglement dispensable in quantum lithography?
15.15- 15.45	J. Croca	Local Wavelet Analysis versus nonlocal Fourier ontology
15.45- 16.15	G. Bjork	Mutually unbiased bases entanglement structures and complementarity relations
16.15- 17.00	Coffee break and poster session	

Session IV - Chairman: G.S. Agarwal

17.00- 17.30	K. Banaszek	Characteristic squeezing modes in optical parametric amplification
17.30- 18.00	S. Pascazio	Neutron antibunching
18- 18.15	K. Yuasa	Projection Operator Method for Open Quantum Systems in the Presence of Initial Correlations
18.15 - 18.30	N. Nayak	Spin squeezing and entanglement in a dispersive cavity
18.30- 19.15	Poster session	
20.00	Social Dinner	

Thursday 4th**Session I - Chairman: P. Mataloni**

09.00-09.30	A. Garuccio	One way velocity of light with phase conjugate mirror
09.30-10.00	C. Schmid	Experiments on multi-photon entanglement
10.00-10.30	K. Matsumoto	Hypothesis testing for a Bell pair
10.30-11.00	Y. Shih	Can two-photon correlation of chaotic light be considered as correlation of intensity fluctuations?
11.00-11.30	Coffee break	

Session II - Chairman: M. Rasetti

11.30-12.00	M. Paris	Distribution of information in the presence of noise
12.00-12.30	M. Palma	Entanglement extraction from condensed matter systems
12.30-12.50	F. Casagrande	Atomic correlations, decoherence of mesoscopic cavity field superposition states, and entanglement in a strongly driven micromaser
12.50-13.20	H. Moya-Cessa	Linearization of the ion-laser interaction micromotion included
13.20 – 13.50	F. Bovino	Spatial Orientation using Quantum Telepathy
13.50-15.00	Lunch	

Session III - Chairman: L. Lugiato

15.00-15.30	C. Fabre	Quantum information processing in optical images
15.30-16.00	M. Chekhova	Multimode detection and measurement of intensity correlation functions
16.00-16.15	H. Jeong	Schrödinger's cat paradox revisited: Transfer of quantum properties from a microscopic superposition to a macroscopic mixed system
16.15-16.45	R. Okamoto	Tailoring two-photon interference with phase dispersion
16.45-17.10	Coffee break	

Session IV - Chairman: E. Predazzi

17.10-17.30	V. Giovannetti	Quantum relative positioning in Hilbert space
17.30-17.45	T. Krueger	Entanglement and separability a treatise on different viewpoint
17.45-18.00	N. Nayak	Cavity QED mediated entanglement
18.00-18.30	S. Barrett	Efficient high-fidelity quantum computation using matter qubits and linear optics

Friday 5th		
Session I - Chairman: C. Fabre		
09.00-09.30	J. O'Brien	Optical quantum logic gates and their use in quantum information applications
09.30-10.00	D.Goswami	On the practicality of adiabatic quantum computing with optical schemes
10.00-10.30	C. Macchiavello	Ideal broadcasting and purification of mixed states
10.30-11.00	J. Rarity	Bright multiphotons for optical quantum logic
11.00-11.30	Coffee break	
Session II - Chairman: A. Andreoni		
11.30-12.00	H.Zbinden	Long distance quantum communication: From practical QKD to unpractical quantum repeaters
12.00-12.30	J. Perina	Direct measurement of photon-number statistics and spatial correlations of photon pairs
12.30-13.00	P. Zanardi	Geometric quantum information processing with semiconductor macroatoms
13.00-13.30	F. Benatti	Tests of Complete Positivity in Fiber Optics
13.30-13.45	T. Elze	Gauge symmetry of the third kind and quantum mechanics as an infrared phenomenon
13.45-15	Lunch	
Session III - Chairman: M. Paris		
15.00-15.30	T.Calarco	Quantum control theory for decoherence suppression in quantum gates
15.30-15.50	L. Maccone	Quantum metrology
15.50-16.20	Coffee break	
Session IV - Chairman: Y. Kim		
16.20-16.50	M. D'Ariano	Quantum mechanics from purely operational axioms
16.50-17.20	A. Marzulli	The spin network quantum simulator model
17.20-17.40	F. Raffa	Lie algebras and generalized codewords and gate operators
17.40-17.50	S. Mayburov	Information restrictions in quantum measurements
17:50-18.10	Concluding remarks	

POSTER SESSION

1	E.A. Anagnostakis	Nanoheterointerface Wave Function Penetration Length Photonic Characterisation
2	N. Antonietti	Atmospheric effects on a quantum communication channel between Earth and Space
3	G.P. Beretta	Mechanics and thermodynamics united by maximal-entropy-generation (steepest-entropy-ascent) nonlinear quantum dynamics
4	A. Cernoch	Several experimental implementations of phase covariant quantum cloner
5	T. Del Rosso	Photon pair production by a PPLN-waveguide for a single-photon source at TELECOM wavelength
6	N.C. Dias	Deformation quantization of confined systems
7	M. Gouanere	Experimental observation compatible with the particle internal clock
8	M. Gramegna	On the realization of controlled decoherence effects on a quantum communication channel.
9	L. Krivistky	Dispersion spreading of biphotons in optical fibre and two-photon interference
10	N.L. Harshman	Dynamical Entanglement in Non-Relativistic, Elastic Scattering
11	S. Hassan	Information entropy of a single-mode cavity QED of a Raman interaction
12	S.P. Maydanyuk	Invisible nuclear system
13	S. Mayburov	Information-Theoretical Restrictions on Quantum Measurements
14	R. Nakhmanson	Evolution, Information and Foundations of Quantum Mechanics
15	A. Napoli	Interpreting concurrence in terms of covariances
16	F. Piacentini	Reconstruction of photon statistics in bi-partite case, experimental details.
17	J.N. Prata	Environment-Induced Decoherence in Noncommutative Quantum Mechanics
18	E.Puddu	Ghost Imaging Protocol with Intense Correlated Fields for Efficient Encryption
19	M. Rajteri	Development of superconducting single-photon detectors at I.N.R.I.M.
20	I. Ruo Berchera	On calibration of analog detectors by using PDC correlations.
21	L.G.P. Saavedra	The Spin and Magnetic Moment Unmeasurability of Free Electrons in Quantum Computation and Information
22	G. Scarcelli	Is Entanglement Dispensable in Quantum Lithography?
23	L. Sperandio	New experimental limit on the Pauli exclusion principle violation by electrons (the VIP experiment)
24	P. Traina	Violation of local realism by ququaters
25	G. Zambra	Photon statistics using low resolution threshold photon counters
26	R. Zapatin	How 'hot' are mixed quantum states?
27	A. Zavatta	Remote preparation of single-photon time-encoded ebits and their homodyne tomography characterization