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5th Workshop ad memoriam of Carlo Novero
Advances in Foundations of Quantum Mechanics and
Quantum Information with atoms and photons
Under the High Patronage of the President of the Italian Republic

3rd IQIS 2010

Program

Istituto Nazionale di Ricerca Metrologica (INRIM)
Conference Hall
Strada delle Cacce 91
Turin, Italy

23-29 May 2010

Sunday 23		
Venue		
Monday 24		
08:45-09:00	Opening: M. Genovese	
Session I - Chairperson: S. Kulik		
09:00-09:25	G. Agarwal	Detrimental effects of quantum noise on entanglement and how to save against it
09:25-09:50	S. Polyakov	Quantum interfaces: will photons from dissimilar sources interfere?
09:50-10:15	C. Bamber	Transverse wavefunction measurement of a single photon source
10:15-10:40	G. Kitaeva	Spontaneous parametric conversion down to the terahertz range
10:40-11:00	Coffee break	
Session II - Chairperson: M. Chekhova		
11:00-11:25	A. Kamli	Quantum informatics with plasmonics meta-materials
11:25-11:50	K. Yuasa	Interference of Bose gases and Bose-Einstein condensation
11:50-12:15	A. Pathak	Let us play with the quantum circuits
12:15-12:40	S. Takeuchi	Photonic quantum circuits and its application
12:40-13:05	G. Marmo	Separability and entanglement in the geometrical formulation of quantum mechanics
13:05-13:25	W. Schempp	Gravitational red shift measurement and synchronized connectivity assessment
13:25-14:30	Lunch	
Session III – Chairperson: E. Giacobino		
14:30-14:55	A. Sergienko	“Ghost” imaging with aberration cancellation
14:55-15:20	Y. Shih	Physical reality and two-photon interference of thermal light
15:20-15:45	S. Kulik	Spectrum of spontaneous parametric down conversion and its control via thermo-and electro-optical effects
15:45-16:10	U. Andersen	Noiseless phase amplification using noise
16:10-16:30	Coffee break	
Session IV - Chairperson: A. Sergienko		
16:30-16:55	M. Bellini	Manipulating light states by single-photon addition and subtraction
16:55-17:20	G. Brida	The quantum candela
17:20-17:45	E. Giacobino	Microcavity polaritons: from quantum optics to quantum fluids
17:45-18:10	Y. Kim	Reversing the weak quantum measurement for a photonic qubit
18:10-18:35	R. Migliore	Entanglement dynamics of two interacting qubits in independent reservoirs
18:35-18:50	V. Ignatovich	On EPR paradox, Bell's inequalities, and experiments that prove nothing

Tuesday 25**Session I - Chairperson: S. Haroche**

09:00-09:25	A. Aiello	Continuous-variable hyperentanglement in azimuthally polarized doughnut modes
09:25-09:50	A. Lvovsky	Quantum technology of light at the two-photon level
09:50-10:15	L. Krivitsky	Polarization tomography of broadband polarization entangled states
10:15-10:40	S. Olivares	Qubit phase estimation in the presence of noise: the Bayesian approach
10:40-11:00	Coffee break	

Session II- Chairperson: E. Predazzi

11:00-11:25	S. Haroche	Generating, reconstructing and controlling quantum states of light in a cavity
11:25-11:50	F. De Martini	Decoherence-free macroscopic quantum superpositions: up-link micro-macroscopic teleportation
11:50-12:15	N. Imoto	Managing multipartite entanglement
12:15-12:40	M. Fedorov	Symmetry and entanglement of qutrits and ququarts
12:40-13:05	N. Treps	Quantum limits to space time positioning with light
13:05-13:25	R. Filip	Universal quantum interface
13:30-14:30	Lunch	

Session III- Chairperson: S. Pascazio

14:30-14:55	C. Curceanu	Experimental tests of quantum mechanics
14:55-15:20	M. Genovese	Experimental realisation of sub shot noise quantum imaging
15:20-15:45	G. Björk	Feasibility analysis of a W state Bell test
15:45-16:10	B. Englert	Minimal tomography with efficient witnesses
16:10-16:30	Coffee break	

Session IV - Chairperson: H. Moya-Cessa

16:30-16:55	R. Zambrini	Spatial entanglement in OPOs with photonic crystals
16:55-17:20	Z. Hradil	Operational tomography: fitting of data patterns
17:20-17:45	S. Pascazio	Novel perspectives on the quantum Zeno effect
17:45-18:10	V.I. Manko	Probability representation and suggesting experiments to check state-dependent uncertainty relations
18:10-18:35	F. Petruccione	Non-Markovian unravellings with coloured noise
18:35-18:50	V. Tamma	Towards a physically computable factoring algorithm

Wednesday 26**Session I - Chairperson: B. Englert**

09:00-09:20	P. Traina	Interferometric technique for density matrix reconstruction by on/off detectors
09:20-09:45	O. Pfister	Observation of nonclassical photon-number statistics in a continuous-wave OPO below threshold
09:45-10:10	C. Silberhorn	Quantum information processing using time-multiplexing and optical fiber networks
10:10-10:30	T. Amri	Characterizing the quantum properties of a measurement apparatus: an experimental illustration

Coffee break**Session II- Chairperson: G. Kurizki**

11:00-11:25	D. Chruscinski	Local approach to the non-Markovian evolution of quantum systems
11:25-11:50	I. Degiovanni	Experimental estimation of entanglement at the quantum limit
11:50-12:15	A. Jamiolkowski	On entanglement witnesses in multipartite systems
12:15-12:40	I. Jex	Networks of interacting quantum systems
12:40-13:05	M. Chekhova	Macroscopic squeezed vacuum and its direct detection
13:05-13:25	G. Benenti	Quantum process tomography and distance between quantum channels: a Fano-representation approach

Lunch**Session III - Chairperson: T. Calarco**

14:30-14:55	H. Moya-Cessa	Classical quantum analogies: beam splitters, invariants and nonlinear coherent states
14:55-15:20	G. Kurizki	Manipulating system-bath correlations by unitary and non-unitary operations
15:20-15:45	C. Lupo	The “transitional behaviour” of quantum Gaussian memory channels
15:45-16:10	K. Matsumoto	On monotone 'metrics' in the channel spaces

Coffee break**Session IV - Chairperson: L. A. Wu**

16:30-16:55	J. Perina	Photon-number statistics of twin beams and their spatial properties
16:55-17:20	S. Pádua	Minimal tomography in spatial variables
17:20-17:45	A. Stanley-Clarke	Increased photon collection efficiency from N-V defects in diamond by solid immersion lenses
17.45-18.10	T. Calarco	An ion-atom quantum gate

18:10-19:40

Poster session**19:40****Bus leaving from INRIM to Workshop Dinner**

Thursday 27**Session I - Chairperson: T. Elze**

09:00-09:25	M. Bina	Entanglement transfer in a multipartite cavity QED open system
09:25-09:50	A. Porzio	Non-Gaussian states produced by close-to-threshold optical parametric oscillators
09:50-10:15	K. Semba	Manipulation of entanglement in the heterogeneous quantum system
10:15-10:40	P. Giorda	Gaussian Quantum Discord
10:40-11:00	Coffee break	

Session II- Chairperson: G. Bjork

11:00-11:25	M. D'Ariano	A computational grand-unified theory
11:25-11:50	H. Nikolic	Making nonlocal reality compatible with relativity
11:50-12:15	L. Sanchez Soto	Orbital angular momentum in phase space: a practitioner perspective
12:15-12:40	T. Elze	Aspects of quantum in classical physics
12:40-13:05	A. Khrennikov	Entanglement of quantum systems from correlated classical random fields
13:05-13:25	A. Allevi	Wigner function reconstruction of pulsed fields by direct detection
13:30-14:30	Lunch	

Session III - Chairperson: M. D'Ariano

14:30-14:55	C. Macchiavello	Violation of the generalised quantum Hamming bound in quantum error correction with correlated noise
14:55-15:20	A. Garuccio	Title to be communicated at the printing date
15:20-15:45	D. Bruss	Experimental generation of pseudo bound entanglement
15:45-16:10	L. A. Wu	Old and new aspects of optical imaging
16:10-16:35	C. Monken	Direct measurement of transverse mode entanglement in two-photon states
16:35-16:50	Coffee break	

Parallel Session IVa - Chairperson: A. Khrennikov
Building D, Meeting Hall

16:50-17:05	F. Plastina	From Zeno to anti-Zeno effect on the entanglement, in cavity QED
17:05-17:20	J. Novotny	Asymptotic evolution of random unitary operations
17:20-17:40	T. Iskhakov	Comparison of two absolute calibration methods for photon-counting detectors based on squeezed vacuum direct detection
17:40-17:55	A. Akhmeteli	Is no drama quantum theory possible?
17:55-18:10	G. Garbarino	Minimum detection efficiencies for a loophole-free bell-type test
18:10-18:25	B. Sanctuary	Anomalies in coincidence probabilities in EPR data
18:25-18:40	F. Caruso	Noise and entanglement: from natural photosynthesis to quantum communication

Parallel Session IVb – Chairperson: I. Perina
Building M, Conference Hall

16:50-17:10	I. Ruo Berchera	Detection of multimode spatial correlation in PDC and application to the absolute calibration of a CCD camera
17:10-17:25	I. de Vega	Effects of dissipation in a quantum search algorithm
17:25-17:40	M. Belogolovskii	Quantum engineering of superconducting Josephson devices with ferromagnetic interlayers
17:40-17:55	S. Montangero	Control of many body quantum systems
17:55-18:10	D. Ciampini	New tools for quantum control of ultracold atoms in optical lattices
18:10-18:25	V. Perinova	Quantum quasi-one-dimensional propagation of light in a down-converting medium
18:25-18:40	A. Smerzi	Quantum Zeno, Entanglement and Distinguishability of quantum States

Parallel Session IVc – Chairperson: M. Fedorov
Building M, Meeting Hall

16:50-17:10	A. Meda	Biphoton compression in standard optical fiber
17:10-17:25	M. Paternostro	Entanglement relaxation and preservation due to local spin environments
17:25-17:40	M. Naseri	Probabilistic bidirectional quantum secure communication based on shared partially entangled states
17:40-17:55	A. Fedrizzi	Discrete-time quantum walks on a line with single photons and beam displacers
17:55-18:10	C. Di Franco	Hamiltonian tomography in an access-limited setting without state initialization
18:10-18:25	M. Genoni	Quantifying non-Gaussianity for quantum information
18:25-18:40	F. Buscemi	Entanglement creation in semiconductor quantum dot charge qubit

16:50-18:40	Round table on “PRIN QKD” – Chairperson: M. Mondin
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Friday 28		
Session I - Chairperson: S. Pádúa		
09:00-09:25	V. Giovannetti	Optimal control at the quantum speed limit
09:25-09:50	F. Raffa	On the nonlinear coherent states of trapped ions in laser fields
09:50-10:15	M. Rasetti	A quantum algorithm for the efficient evaluation of j invariants of abelian varieties associated with elliptic curves
10:15-10:35	M. Paris	Transgressing the boundaries: nonGaussian states, nonMarkovian maps and nonentangled correlations in continuous variable quantum information
10:35-11:00	Coffee break	
Session II- Chairperson: M. Rasetti		
11:00-11:25	A. Gatti	X-entanglement, the nonfactorable spatio-temporal structure of biphoton correlation
11:25-11:50	M. Bondani	Non-Gaussian state generation from quantum- and classically-correlated pulsed fields
11:50-12:15	S. Kück	Metrological characterization of single photon detector quantum efficiency
12:15-12:40	M. Lucamarini	Phase-drift Control of a Communication Channel through Asymmetric Encoding and Negative Decoding of Quantum Information
12:40-13:05	J. R. Croca	Experimental determination of the size of the photonic basic mother wavelet A test for the general validity of orthodox quantum mechanics against the nonlinear causal physics
13:05-13:25	T. Durt	Proposal of crucial experiments aimed at testing the existence of a quantum time (super) operator and applications of decay processes in quantum information
13:30-14:30	Lunch	
Session III - Chairperson: J. Walmsley		
14:30-14:55	S. Tanzilli	Guided-wave optics for real quantum relay applications
14:55-15:20	M. Palma	Cold-atom induced control of an opto-mechanical device
15:20-15:45	S. Papp	Multipartite entanglement of atomic-ensemble quantum memories
15:45-16:10	Coffee break	

Parallel Session IVa – Chairperson: M. Palma
Building M, Meeting Hall

16:10-16:25	A. Bayat	Entanglement in the kondo spin chain
16:25-16:40	N. Lo Gullo	Vortex entanglement in Bose-Einstein condensates coupled to Laguerre-Gauss beams
16:40-16:55	N. Harshman	Entanglement in the quantum two-body problem

Parallel Session IVb – Chairperson: A. Jamiolkowski
Building D, Meeting Hall

16:10-16:25	R. López-Peña	Semiclassical description of the Tavis-Cummings ground-state
16:25-16:40	S.V. Prants	Matter-wave chaos with cold atoms
16:40-16:55	P. Marek	Measurement induced amplification of coherent states

Parallel Session IVc – Chairperson: P. Mataloni
Building M, Conference Hall

16:10-16:30	A. Gelman	Laser control of optical properties of two-level atoms embedded in a photonic crystal
16:30-16:45	B. Bellomo	Interplay of adiabatic and quantum noise in solid state entanglement degradation
16:45-17:00	G. Giorgi	Entanglement dynamics of dissipative harmonic oscillators in presence of diversity

Session V – Chairperson: C. Monken

17:00-17:25	J. Walmsley	Towards quantum photonics in the real world
17:25-17:50	P. Mataloni	Quantum computation with multiqubit cluster states based on 2-photon hyperentanglement
17 :50-18 :15	D. Petrosyan	Towards quantum information processing with hybrid quantum devices
18 :15-18 :40	F. Bovino	Title to be communicated at the printing date
18:40-18:50	M.L. Rastello	Conclusive remarks

Saturday 29

Leaving

POSTER SESSION

1	Allegra	Michele	Entanglement properties of nongaussian states
2	Allevi	Alessia	Ghost imaging by intense multimode twin beam
3	Avella	Alessio	Interferometric system for experimental quantum cryptography with orthogonal states
4	Bernal Arroyo	Jorge A.	Quantization of periodic gravitational system
5	Berritta	Marco	Dynamical phase diagram for a chiral quasi particles in a noisy environment
6	Bondani	Maria	On the choice of photoemissive detectors suitable for photon-number statistics of pulsed fields
7	Caldara	Pasquale	Quantum relaxation time in asymmetric bistable potential
8	Chaouche	Yassine	Elastic and vibrational properties of GeSn and SiSn compounds from first principles calculations
9	Ciavarella	Luigi	Characterization of optical measurement apparatuses at the quantum level
10	D'Arrigo	Antonio	Quantum information transmission across a memory amplitude damping channel
11	De Leo	Natascia	Fabrication of superconductor - ferromagnetic SNIFS Josephson junctions for quantum bit implementation
12	Delgado	Francisco	Measurement in control and discrimination of entangled pairs under self-distortion
13	Donati	Gaia	Experimental realization of the Deutsch-Jozsa algorithm with a six-qubit cluster state
14	Ferrero	Miguel	Separability: a new approach from the conic structure of positive operators
15	Florio	Angela	Experimental estimation of entanglement at the quantum limit
16	Fornaro	Giulia	Experimental third-order Ghost Imaging with thermal light
17	Gao	Shan	Can the wave function be a description of the motion of particles?
18	Giorgi	Gian Luca	Ion-trap simulation of the quantum phase transition in an exactly solvable model of spins coupled to bosons
19	Gogyan	Anahit	Deterministic Generation of Indistinguishable Single-Photon Pulses in the Single-Atom-Cavity QED System
20	Gramegna	Marco	Ultrafast Two-Photon Spectral Amplitudes (TPSA) characterisation via propagation in dispersive medium

21	Hassouni	Yassine	From Generalized Heisenberg Algebra (GHA) to Square well potential
22	Ignatovich	Vladimir	Contradictions of the quantum scattering theory
23	Koroli	Vlad	Generation of the non-classical states of the quantized cavity field in the interaction with magneto-optically trapped equidistant three-level atom
24	La Cognata	Angelo	Effect of broadband noise on adiabatic passage in superconducting nanocircuits
25	Leshem	Amir	Violation of smooth observable macroscopic realism in a harmonic oscillator
26	Lolli	Lapo	Ti/Au TES, a superconducting detector for Quantum Information
27	Mayburov	S.N.	Coherent and noncoherent photonic communications in biological systems
28	Mingolla	Griselda	Experiments with twin photons at Buenos Aires University: entanglement, state tomography and two photons interference
29	Mishra	Devendra Kumar	Study of higher order non-classical properties of squeezed Kerr state
30	Mondin	Marina	Soft-information based information reconciliation and privacy amplification techniques for QKD applications
31	Mondin	Marina	In lab feasibility study of earth-space quantum communication channel
32	Montangero	Simone	Control of many body quantum systems
33	Naseri	Mosayeb	Quantum message exchanging network using entanglement swapping and decoy photons
34	Park	Hee Su	Iterative entanglement distillation of two-photon polarization-entangled states using tunable local filters
35	Piacentini	Fabrizio	Experimental realization of a noiseless heralded single photon source
36	Priego Hernández	Gastón Alejandro	Classical limit calculation for the quantum harmonic oscillator by using fourier transform of probabilities density
37	Sheikhehi	Faiegh	A new secure quantum dialogue using entanglement swapping