

# Quantum Theory: Reconsideration of Foundations - 4

June 11-16, 2007

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## Program of the Conference

Arranged by ICMM  
International Centre for Mathematical Modelling in Physics,  
Engineering and Cognitive Sciences  
Växjö University, Sweden

See: [www.msi.vxu.se/aktuellt/konferens/](http://www.msi.vxu.se/aktuellt/konferens/)

Supported by:

**Swedish Research Council**  
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**Swedish Royal Academy of Science**

### Organizing committee:

A. Khrennikov, Växjö University, Sweden  
P. Lahti, *University of Turku, Finland*  
V. Manko, *Lebedev Physical Institute, Moscow, Russia*  
Th. Nieuwenhuizen, *Amsterdam University, The Netherlands*  
M.O. Scully, *University of Texas, USA*

### Location:

The conference will take place at Växjö University. Main conference room: Myrdal, in building K.

*A map of the campus is available at: [/www.vxu.se/english/040824\\_map\\_eng.pdf](http://www.vxu.se/english/040824_map_eng.pdf)*

### Transportation:

From Resecentrum (located close to the train station) to the University: Busses number **7** and **5**, direction "Universitet".

To come to the first day and registration, Monday 11<sup>th</sup>, the bus number **7** at 8.15 is the most convenient.

To come to the first lecture of morning sessions, the bus number **7** at 8.45 or bus number **5** at 8.43 seems the most convenient

By fair weather, it is also possible to walk to the university along the lakes. It takes between 40 and 50 minutes.

<b>8.40-9.15</b>	<b>Registration: in front of Myrdal</b>	
<b>9.15-9.20</b>	<b>Opening Ceremony</b>	
	<i>Chairman: Andrei Khrennikov</i>	Conference Room: Wicksell
<b>9.20-10.00 Opening Lecture</b>	Timothy Boyer, <i>City College of the City University of New York, USA</i>	Unresolved Classical Electromagnetic Aspects of the Aharonov-Bohm Phase Shift
<b>10.10-10.45</b>	Willem de Muynck, <i>Eindhoven University of Technology, The Netherlands</i>	From Copenhagen to neo-Copenhagen interpretation
<b>11.00-11.30</b>	<b>Coffee Break</b>	
	<i>Chairman: Timothy Boyer</i>	
<b>11.30-12.05</b>	Leslie Ballentine <i>Simon Fraser University, Canada</i>	Objective and Subjective Probabilities in Quantum Mechanics
<b>12.15-12.50</b>	Gregg Jaeger <i>Boston University, USA</i>	Decoherence, Disentanglement and the Foundations of Quantum Mechanics
<b>13.15-14.30</b>	<b>Lunch: at Restaurant Kristina</b>	
	<i>Chairman: Leslie Ballentine</i>	
<b>14.30-15.05.</b>	Bob Coecke <i>Oxford University, UK</i>	Kindergarten quantum mechanics II: shaping the ordinary world
<b>15.10-15.45</b>	Margareta Manko <i>Lebedev Physica Institute, Moscow, Russia</i>	Tomographic Entropy and New Entropic Uncertainty Relations
<b>15.50 -16.25</b>	Bart D'Hooghe <i>Vrije Universiteit Brussel, Belgium</i>	Simulating quantum computation on a macroscopic model
<b>16:30-17.00</b>	<b>Coffee Break</b>	
<b>17.00</b>	<b>PARALLEL SESSIONS</b>	
-	Session 1 : Wicksell Session 2 : Myrdal Session 3 : Weber	(SEE VERSO OF THIS PAGE FOR DETAILS)
<b>18.25</b>		
<b>19.00</b>	<b>Welcome Barbecue-buffet will be served in the garden of Teleborg Castle</b>	

<b>SESSION 1</b>	<i>Chairman: Bob Coecke</i>	Conference Room: Wicksell
<b>17.00-17.25</b>	Mehrnoosh Sadrzadeh <i>University of Southampton, UK</i> <i>(joint work with Elham Kashefi, Oxford University)</i>	Epistemic measurement calculus
<b>17.30-17.55</b>	Silvia Pulmannova <i>Slovak Academy of Sciences</i> <i>(joint work with D. Foulis)</i>	Polar decompositions in e-rings
<b>18.00-18.25</b>	Bahar Mehmani <i>University of Amsterdam, The Netherlands</i>	Simultaneous measurement of non-commuting observables within the Jaynes-Cummings Model
<b>SESSION 2</b>	<i>Chairman: Margareta Manko</i>	Conference Room: Myrdal
<b>17.00-17.25</b>	Emmanuel Haven <i>University of Leicester, UK</i>	Arbitrage via quantum numbers
<b>17.30-17.55</b>	Börje Nilsson, <i>Växjö University, Sweden</i> <i>(joint work with Andrei Khrennikov)</i>	Exact Solutions of the Schrödinger Equation Quantum
<b>18.00-18.25</b>	Norifumi Yamada <i>University of Fukui, Japan</i>	Decoherent histories approach might be predictive even when the decoherence condition does not hold
<b>SESSION 3</b>	<i>Chairman: Karl Gustafson</i>	Conference Room: Weber
<b>17.00-17.25</b>	Marian Kupczynski <i>University of Ottawa, Canada</i>	EPR Paradox, locality and completeness of Quantum Theory
<b>17.30-17.55</b>	Sandro Sozzo <i>University of Salento, Italy</i>	Generalized BCHSH Inequalities within the ESR model
<b>18.00-18.25</b>	Claudio Garola <i>Italy</i>	Reconciling Local Realism with Quantum Mechanics: The ESR Model
<b>19.00</b>	<b>Welcome Barbecue-buffet will be served in the garden of Teleborg Castle</b>	

	<i>Chairman: Wolfgang Freudenberg</i>	Conference Room: Wicksell
<b>9.15-9.50</b>	Pekka Lahti <i>University of Turku, Finland</i>	Heisenberg's Uncertainty Principle
<b>10.00-10.35</b>	Andrei Khrennikov <i>Växjö University, Sweden</i>	Quantum Mechanics as Approximation of Statistical Mechanics of Classical Fields: order of Approximation.
<b>10.45-11.10</b>	<b>Coffee Break</b>	
	<i>Chairman: Pekka Lahti</i>	
<b>11.10-11.45</b>	Vladimir Manko <i>Lebedev Physical Institute, Moscow, Russia</i>	Probability instead of Wave Function and Bell Inequality as Entanglement Criterion
<b>11.55-12.30</b>	Hrvoje Nikolic <i>Rudjer Boskovic Institute, Croatia</i>	Classical mechanics as nonlinear quantum mechanics
<b>12.35-13.00</b>	Guillaume Adenier <i>Växjö University, Sweden</i> (joint work with Andrei Khrennikov)	Is the moon there when nobody looks?
<b>13.15-14.30</b>	<b>Lunch: at Restaurant Kristina</b>	
	<i>Chairman: Vladimir Manko</i>	Conference Room: Wicksell
<b>14.30-15.05</b>	Wolfgang Freudenberg <i>Brandenburg University of Technology, Germany</i>	On a Quantum Model of the Recognition Process
<b>15.10-15.45</b>	Willy De Baere <i>University of Gent, Belgium</i>	Reality and locality in quantum theory
<b>15.50-16.25</b>	Gianni Cassinelli <i>University of Genova, Italy</i>	Mathematical foundations of Quantum Tomography
<b>16.30-17.00</b>	<b>Coffee Break</b>	
	<i>Chairmen: Andrei Khrennikov, Pekka Lahti, Vladimir Manko, Theo Nieuwenhuizen</i>	Conference Room: Wicksell
<b>17.00-19.00</b>	<p><b>Conference Round Table</b></p> <p>1). <i>Quantum nonlocality. Can one find evidence for nonlocality without appealing to Bell's inequality? Experiments?</i></p> <p>2). <i>Sources of quantum randomness. Is it really irreducible?</i></p> <p>3). <i>Quantum formalism: Is it just new mathematics or new physics?</i></p> <p>4). <i>Quantum fluctuations. Vacuum.</i></p> <p>5). <i>Stochastic Electrodynamics: Can it solve all problems of QM or not?</i></p> <p>6). <i>Quantum mechanics: Is it just an approximation of something beyond it?</i></p> <p>7). <i>Completeness of QM:</i> Vote: a). Complete, b) Not Complete</p> <p>8). <i>Bell's inequality: Does its violation really imply that local realism is incompatible with the formalism of QM?</i> Vote : a). Yes, b). No</p> <p>9). <i>Suppose at the moment that QM is not complete. What could one expect to find beyond QM? How could we use "beyond QM theory"</i></p> <p>10). <i>Why quantum logic did not diffuse so much in traditional quantum physics?</i></p> <p>11). <i>Quantum probability: just non-Kolmogorovness or something more? If more, then what?</i></p> <p>12). <i>Can the formalism of QM be applied elsewhere outside physics?</i></p> <p>Comment regarding questions 7) and 8): Experience from previous conferences is that it is meaningless to debate these problems, just vote. P.S. This year it is forbidden to vote in the quantum way: e.g. "yes" for both a) and b).</p>	

	<i>Chairman: Luigi Accardi</i>	Conference Room: Wicksell
<b>9.15-9.50</b>	Giacomo Mauro D'Ariano <i>Università di Pavia, Italy</i>	Mathematical structures of Quantum and Classical Mechanics and their connections to operational principles.
<b>10.00-10.35</b>	Yuri Ozhigov <i>Moscow State University, Russia</i> <i>Joint work with Alexei Ozhigov</i>	Algorithmic approach to quantum theory
<b>10.40-11.15</b>	Theo Nieuwenhuizen <i>Amsterdam University, The Netherlands</i>	Einstein versus Maxwell: is gravitation a curvature of space or a field in flat space?
<b>11.25-11.45</b>	<b>Coffee Break</b>	
	<i>Chairman: Theo Nieuwenhuizen</i>	
<b>11.45-12.20</b>	Jose Pereira <i>Instituto de Fisica Teorica – UNESP, Brasil</i>	Cosmological Term and Quantum Physics
<b>12.25-13.00</b>	Petz Denes <i>A.Renyi Institute of Mathematics, Hungary</i>	Complementarity in Quantum Systems
<b>13.15- 14.30</b>	<b>Lunch: at Restaurant Kristina</b>	
	<i>Chairman: Petz Denes</i>	Conference Room: Wicksell
<b>14.30-15.05</b>	Arcady Plotnitsky <i>Purdue University, USA</i>	From Como to Copenhagen; The Beginnings and Ends of Complementarity
<b>15.15-15.30</b>	Johan Sterte <i>Rektor of Växjö University</i>	Welcome Speech
<b>15.45-16.20</b>	Paolo Rochi <i>IBM, Rome, Italy</i>	Acquisition of Information is achieved by the Measurement Process in Physics
<b>16.25-17.00</b>	<b>Coffee Break</b>	
<b>17.00</b>	<b>PARALLEL SESSIONS</b>	<b>(SEE VERSO OF THIS PAGE FOR DETAILS)</b>
-	Session 1 : Wicksell Session 2 : Myrdal Session 3 : Weber	
<b>19.25</b>		

SESSION 1	Chairman: Ingemar Bengtsson	Conference room: Wicksell
17.00-17.25	Åsa Ericsson <i>Stockholm University, Sweden</i>	Quantum mixtures
17.30-17.55	Tomoyuki Morimae <i>University of Tokyo, Japan</i>	Visualization of superposition of macroscopically distinct states by joint probability density of macroscopic observables
18.00-18.25	Jukka Kiukas <i>University of Turku, Finland</i>	Moment operators of observables in the balanced homodyne detection scheme
18.30-18.55	Philip Goyal <i>University of Cambridge, UK</i>	The Average-Value Correspondence Principle
SESSION 2	Chairman: Bo Hellsing	Conference room: Myrdal
17.00-17.25	Oleg Olkhov N.N.Semenov Institute of Chemical Physics, Moscow, Russia	Geometrization of Classical Wave Fields
17.30-17.55	Hiromu Ishio <i>Nagoya University, Japan</i>	Transition from Quantum to Classical: Numerical Evidence in Transport through Open Chaotic Cavities
18.00-18.25	Chen Lu <i>Tohoku University, Japan</i>	Tight-Binding Quantum Chemical Molecular Dynamics Study on the Electronic Structure and Electrical Characteristics of Titanium Dioxide
18.30-18.55	Feng Hongjian <i>Beihang University(BUAA); China</i>	First-principles calculation for the perovskites compounds within DFT
SESSION 3	Chairman: Hrvoje Nikolic	Conference room: Weber
17.00-17.25	Andrey Akhmeteli <i>Intelligent Optical Systems, USA</i>	Electromagnetic Field as the Guiding Field in the Bohmian Mechanics
17.30-17.55	Al Kracklauer <i>Nurnberg, Germany</i>	Empirical evidence contra Nonlocality
18.00-18.25	Eric Cavalcanti <i>University of Queensland, Australia</i>	Criteria for EPR-Bohm correlations and Steering
18.30-18.55	Ilija Barukcic <i>GP, Germany</i>	Bell's Theorem - A fallacy of the excluded middle.
19.00-19.25	Josef Tkadlec <i>Czech Technical University, Czech Republic</i>	Effect algebras and the maximality property

	Chairman: Gregg Jaeger	Conference room: Wicksell
09.15-09.55	Bo Hellsing <i>Göteborg University, Sweden</i>	Phonons and lifetimes at surfaces
10.00-10.30	Thilo Bauch <i>Chalmers University of Technology, Göteborg, Sweden</i>	Quantum Dynamics of a d-wave Josephson Junction
10.35-11.15	Ingemar Bengtsson <i>Stockholm University, Sweden</i>	Geometry of quantum states
11.25-12.00	<b>Light meal, sandwiches before excursion</b>	<i>(served outside of Wicksell)</i>
12.15	<p><b>Excursion – Carl von Linné</b></p> <p><b>Bus departs from Taxi zone A</b> (same place as for bus 7)</p> <p><b>The excursion goes to Linnés Råshult</b> Linné's birthplace and Sweden's tenth cultural reserve <a href="http://www.linnesrashult.se/">www.linnesrashult.se/</a></p> <p><b>Möckelsnäs, Orangery</b> The garden currently contains approximately 700 indoor and outdoor species. Before being allowed to grow in this garden, a species must possess some link to Linné and/or his pupils. Most of the plants here were named by Linné himself. <a href="http://www.linnesrashult.se/index.cfm?pageID=36">www.linnesrashult.se/index.cfm?pageID=36</a></p>	<p>Arrival 13.30 at Linnés Råshult We split into 2-3 groups (english speaking guides)</p> <p>14. 30 bus to Möckelsnäs 14.45 arrival at Möckelsnäs</p> <p>15.00 We split into 2 groups (English speaking guides)</p> <p>Group 1, will visit the Orangery and at 15.30 have coffee and cake Group 2, will have coffee first and then visit the Orangery at 15.30</p>
16.15	<b>Bus departure back to Växjö</b>	
17.15	<b>Arrival in Växjö</b>	
18.35	<b>Bus to the banquet at Teleborgs Castle</b>	
18.40	<p><b>Bus departs from Elite Stadshotellet</b></p> <p><b>Bus departs from Quality Hotel Teaterparken</b> <i>(guests from Royal Corner should pick the bus at Quality Hotel Teaterparken)</i></p>	
19.00	<b>Conference dinner at Teleborgs Castle</b>	
around 22.30	<b>Bus departure back to the hotels</b>	

	<i>Chairman: Gianni Cassinelli</i>	Conference room: Wicksell
<b>10.15-10.50</b>	Andrei Grib <i>St. Peterburg Pedagogical University, Russia</i>	Macroscopic realizations of quantum logics and quantum games
<b>10.55-11.30</b>	Luigi Accardi <i>Università di Roma II, Italy</i>	Universality of the EPR--chameleon model
<b>11.35-12.00</b>	<b>Coffee Break</b>	
	<i>Chairman: Andrei Grib</i>	
<b>12.00-12.35</b>	Karl Gustafson <i>University of Colorado, Boulder, USA</i>	The Born Rule
<b>12.40-13.15</b>	Geoffrey Sewell <i>Queen Mary, University of London, UK</i>	Can the quantum measurement problem be resolved within the framework of standard quantum dynamics?
<b>13.30-14.30</b>	<b>Lunch: at Restaurant Kristina</b>	
	<i>Chairman: Jan Hamhalter</i>	Conference room: Wicksell
<b>14.40-15.15</b>	Chandrasekhar Roychoudhuri <i>University of Connecticut, USA</i>	Shall we climb on the shoulders of the giants to extend the REALITY horizon of Physics?
<b>15.30</b>	<b>PARALLEL SESSIONS</b>  Session 1 : Wicksell Session 2 : Myrdal Session 3 : Weber	<b>(SEE VERSO OF THIS PAGE FOR DETAILS)</b>
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<b>17.55</b>		

SESSION 1	Chairman: Chandrasekhar Roychoudhuri	Conference room: Wicksell
15.30-15.55	Bryan Sanctuary <i>McGill University, Montreal, Quebec.</i>	Completing quantum mechanics: Evidence for and properties of spin microstates
16.00-16.25	N. Vinh Quaaang <i>Institute of Physics and Electronics, Hanoi, Vietnam</i>	The principally weak points of the current mathematical tools and self-inconsistence of Quantum Physics
16.30-17.00	Coffee Break	
17.00-17.25	Gian Paolo Beretta <i>Università di Brescia, Italy</i>	Completing quantum mechanics with thermodynamics by assuming intrinsic entropy and intrinsic irreversibility at the fundamental level
17.30-17.55	Ghenadie Mardari <i>Rutgers University, USA</i>	A new approach to the Copenhagen Interpretation
18.00-18.25	Ken Wharton <i>San Jose State University, USA</i>	A Novel Interpretation of the Klein-Gordon Equation
18.30-18.55	Gianni Garbarino <i>University of Torino, Italy</i>	Kaonic Quantum Erasers
SESSION 2	Chairman: Al Kracklauer	Conference room: Myrdal
15.30-15.55	Boris Khots <i>Compressor Controls Corporation, USA</i>	Quantum Theory and Observers Mathematics
16.00-16.25	Hans H. Grelland <i>Agder University College, Grimstad, Norway</i>	Physical Concepts and Mathematical Symbols
16.30-17.00	Coffee break	
17.00-17.25	Richard Woessler <i>Germany</i>	Probability Paradoxes and a Strategy to Search for its Solutions
17.30-17.55	Nikolai Chuprikov <i>Tomsk State Pedagogical University, Russia</i>	The continuity equation is a bridge to connect quantum and classical probabilities
18.00-18.25	Aalok Pandya <i>University of Rajasthan, Jaipur, India</i>	Background Independent Quantum Mechanics, Metric of Quantum States, and Gravity: A Comprehensive Perspective
SESSION 3	Chairman: Robin Hudson	Conference room: Weber
15.30-15.55	Peter Nyman <i>Växjö University, Sweden</i> (joint work with Andrei Khrennikov)	Simulation of Quantum Algorithms with a Symbolic Programming Language
16.00-16.25	Richa Garg <i>University institute of engineering and technology, India</i>	An Efficient Montgomery Multiplication Algorithm
16.30-17.00	Coffee Break	
17.00-17.25	Mihai Popa <i>IU Bloomington IMRA, USA</i>	Combinatorial Approach to Monotonic Independence over a $C^*$ -algebra
17.30-17.55	Subhash Chaturvedi <i>Stockholm University, Sweden</i>	Spectra of phase point operators in odd prime dimensions and the extended Clifford group
18.00-18.25	Mohammad Ali Fasihi Aghbolagh <i>Azarbaijan Univ. of Tarbiat Moallem, Iran</i>	One dimensional pseudo Hermitian quasi exactly solvable models

	<i>Chairman: Jan Hamhalter</i>	Conference room: Wicksell
<b>09.15- 09.50</b>	Wilhelm von Waldenfels <i>University of Heidelberg, Germany</i>	Radiative transfer by polarized light.
<b>10.00-10.35</b>	Robin Hudson <i>University of Loughborough, UK</i>	Capelli processes: a family of classical stochastic processes constructed by Quantum stochastic calculus
<b>10.40-11.05</b>	Laura Cattaneo <i>Bonn University, Germany</i>	A mathematical rigorous representation of the Feynman-Vernon influence functional
<b>11.10-11.30</b>	<b>Coffee Break</b>	
	<i>Chairman: Andrei Khrennikov</i>	
<b>11.30-11.55</b>	Melanie Hinz <i>University Greifswald, Germany</i>	Free Cumulants for some Classes of Probability Measures
<b>12.00-12.25</b>	Jan Hamhalter <i>Czech Technical University -El.Eng, Czech Republic</i>	Unentangled states on operator algebras and tensor products A
<b>12.30-12.35</b>	Andrei Khrennikov	Closing speech
<b>12.45-13.30</b>	<b>Lunch</b>	