

Quantum Structures V

Official Program

Sections of the conference:

Logico-Algebraic Structures and Axiomatics [**Alg**]

The Unsharp Approaches [**Unsh**]

Measures and Probabilities [**Prob**]

Quantum Computation [**Comp**]

Spacetime, Quantum Histories, Quantum Gravity [**Tim**]

Bohmian Mechanics [**Bohm**]

Interpretations of Quantum Theory and the Measurement Problem [**Int**]

Saturday, March 31

Cesena, Palazzo del Ridotto, Piazza Almerici

Morning session

Chair: M.L. Dalla Chiara

Opening 10.00

Panel discussion:

"What can physics tell us about human knowledge?" (introduced by G.Toraldo di Francia)

12.00 *IQSA Awards ceremony*

Afternoon session

Chair: R. Greechie

15.00 *Invited lecture* A.M. Gleason, Groups of Homeomorphisms

16.00 *Invited lecture* I. Pitowsky, On Finite Gleason's Theorems and Related Problems

Sunday, April 1

ROOM A

8.45-9.45 [**Prob**]

Chair: F. Chovanec

L. Levitin, T. Toffoli, Z. Walton, Distinguishability of Ensembles of Identical Quantum Systems

R. Frič, Measures on *MV*-Algebras

10-11 [**Prob**]

Chair: P. Pták

D. Mundici, Issues in *MV*-Algebraic Probability Theory

B. Riečan, On the Probability Theory on some Quantum Structures

11-11.30

Coffee Break

11.30-12.30 [**Unsh**]

Chair: F.E. Schroeck, Jr.

S. Pulmannová, Divisible Effect Algebras and Interval Effect Algebras

A. Dvurečenskij, From Quantum Structures to Pseudo *MV*-Algebras

ROOM B

8.45-9.45 [**Alg**]

Chair: G. Bacciagaluppi

K. Svozil, On Possible Extensions of Quantum Mechanics

L. Hardy, Can We Obtain Quantum Theory From Reasonable Axioms?

10-11 [**Bohm**]

Chair: L. Hardy

N. Zanghì, Bohmian Mechanics as a Quantum Theory without Observers

R.C. Bishop, The Quantum Mechanical Arrow of Time and Rigged Hilbert Space

11-11.30

Coffee Break

11.30-12.30 [**Tim**]

Chair: F.M. Kronz

M. Drieschner, H. Lyre, N. von Rummell, T.O. Eynck, A versus B! Gauge Potentials, Reality and the Aharonov-Bohm effect

I. Raptis, Introducing a Quantum Topos where Curved Quantum Causality Meets Warped Quantum Logic

ROOM A

15.00-16.00 [**Int**]

Chair: R.R. Zapatin

S. D'Agostino, From Rational Numbers to Dirac's Bra and Kets: A History of the Symbolic Representation of Physical Laws

L. Szabó, New Developments in Fine's Interpretation of Quantum Mechanics

16.15-17.15 [**Tim**]

Chair: K.E. Hellwig

F.M. Kronz, On the Interpretive Significance of Inequivalent Representations and Type-III Factors in Algebraic Quantum Theory

E. Castellani, Symmetries and Constraints

17.15-17.45
Coffee Break

ROOM B

15.00-16.00 [**Alg**]

Chair: A. Wilce

D.A. Smith, Finitely-Generated Partial Boolean Algebras in Ortho-
modular Lattices

F. Valckenborgh, General Propositional Lattices

16.15-17.15 [**Alg**]

Chair: B. Riečan

F. Katrnoška, Note on Jordan Groupoids

I. Stubbe, A Corestriction of the Yoneda Embedding as Frame Com-
pletion of a Bounded Poset with Finite Meets, with an Application to
Quantum Logic

17.15-17.45
Coffee Break

ROOM A

17.45-18.45

Chair: G. Cassinelli

Invited lecture

J. Butterfield, C.J. Isham, On Sieve-valued and Interval-valued Val-
uations in Quantum Theory

Monday, April 2

ROOM A

8.45-9.45 [**Alg**]

Chair: R. Giuntini

A. Wilce, Topological Test Spaces

G. Cassinelli, Group Theoretical Quantum Tomography

10-11 [**Int**]

Chair: J. Butterfield

P. Mittelstaedt, Quantum Logic and Decoherence

G.C. Ghirardi, Fundamental versus Practical Decoherence in Quantum Mechanics

11-11.30

Coffee Break

11.30-12.30 [**Bohm**]

Chair: N. Zanghì

G. Bacciagaluppi, Identical Particles in Pilot-Wave Theories

V. Allori, Bohmian Mechanics and the Classical Limit of Quantum Mechanics

ROOM B

8.45-9.45 [**Int**]

Chair: G.C. Ghirardi

H. Halvorson, Nonregular Representations of the CCRs and the Copenhagen Interpretation of Quantum Theory

V.P. Belavkin, Quantum Noise, Bits and Jumps: Causality, Decoherence, Measurement and Filtering

10-11 [**Prob**]

Chair: M. Navara

F. Chovanec, E. Drobn'a, On a Construction of a State on a Non-Atomic σ -Complete Boolean D-Poset

M. Jureckova, On the Conditional Expectation on Probability *MV*-Algebras with Product

11-11.30

Coffee Break

11.30-12.30 [**Unsh**]

Chair: F. Kôpka

T. Vetterlein, Structure Theory for Pseudo-Effect Algebras

B. Vacchini, Dissipative Systems and Objective Description: Quantum Brownian Motion as an Example

ROOM A

15.00-16.00 [**Comp**]

Chair: J. Pykacz

G. Cattaneo, M.L.Dalla Chiara, R. Giuntini, An Unsharp Quantum Logic from Quantum Computation (I)

G. Cattaneo, M.L.Dalla Chiara, R. Giuntini, An Unsharp Quantum Logic from Quantum Computation (II)

16.15-17.15 [**Comp**]

Chair: D. Aerts

G. Cattaneo, A. Leporati, R. Leporini, Fredkin Gates for Finite-valued Conservative Logics

G. Cattaneo, A. Leporati, R. Leporini, Quantum Realization of Fredkin Gates for Finite-valued Weakly Conservative Reversible Logics

17.15-17.45
Coffee Break

ROOM B

15.00-16.00 [**Alg**]

Chair: T. Placek

L. Roman, R. Zuazua, Gelfand Quantales and Orthomodular Lattices

A.M. Bikchentaev, A.D. Maklakov, On Hermitian Idempotents over Finite Fields

16.15-17.15 [**Alg**]

Chair: J. Harding

F. Sultanbekov, On (2,3)-Homogeneous Greechie Orthomodular Posets

A. Drago, A. Venezia, A Proposal for a New Approach to Quantum Logic

17.15-17.45
Coffee Break

ROOM A

17.45-18.45

Chair: G. Cattaneo

Invited lecture

H.N. Barnum, The Power and Limits of Quantum and Classical Information Processing: towards a Logico-Algebraic Approach

Tuesday, April 3

ROOM A

8.45-9.45 [**Prob**]

Chair: A. Mayet

A. De Simone, M. Navara, Rüttimann Decomposition of States

R. Hudson, S. Pulmannová, Algebraic Theory of Single and Double Product Integrals in Quantum Stochastic Calculus

10-11 [**Prob**]

Chair: L.E. Szabó

J. Cachro, Generalized Probability Spaces are not Appropriate for EPR. A Theme from Malament

D. Costantini, U. Garibaldi, Liouville Equation and Markov Chains: Epistemic and Ontological Probabilities

11-11.30

Coffee Break

11.30-12.30 [**Prob**]

Chair: R. Bishop

A. Jenčová, On Quantum Information Geometry

A. Rossi, Energy-Information Coupling from Classical to Quantum Physics

ROOM B

8.45-9.45 [**Tim**]

Chair: P. Mittelstaedt

G. Auletta, The Fundamental Theorem of Measurement and Critical Examination of MWI and Decoherent Histories

L. Lanz, B. Vacchini, O. Melsheimer, Finite Systems in Quantum Mechanics: A New Way to Look at Microsystems

10-11 [**Tim**]

Chair: D. Finkelstein

G. Nisticò, R. Beneduci, Consistency of Quantum Histories, is it an Individual Property?

P. Zizzi, The Early Universe as a Growing Quantum Network

11-11.30
Coffee Break

11.30-12.30 [**Tim**]

Chair: F. Laudisa

T. Placek, Comparative Similarity in Branching Space-Times

T. Müller, Branching Space-Time as a Semantics for Modal Talk in Quantum Mechanics

ROOM A

15.00-16.00 [**Int**]

Chair: I. Pitowsky

C. Garola, A Simple Model for an Objective Interpretation of Quantum Mechanics

K.-E.Hellwig, S. Chumakov, How to Make Entangled Schrödinger Cats

16.15-17.15 [**Alg**]

Chair: G. Chevalier

P. Pták, Albeit Incomplete ...

J. Paseka, Morita Equivalence of Quantum Structures

17.15-17.45
Coffee Break

ROOM B

15.00-16.00 [**Unsh**]

Chair: S. Pulmannová

F. Kôpka, The Regularity Condition on Posets with the Symmetric Difference

G. Jenča, Blocks of Homogeneous Effect Algebras

16.15-17.15 [**Unsh**]

Chair: C. Garola

F.E. Schroeck, Jr., The Effect Algebra in the Formalism of Quantum Mechanics on Phase Space

J. Pykacz, Many-Valued Representation of Quantum Structures

17.15-17.45

Coffee Break

ROOM A

17.45-18.45

Chair: H.N. Barnum

Invited lecture

J. Hamhalter, States and Structure of von Neumann Algebras

Wednesday, April 4

ROOM A

8.45-10.15 [**Alg-Prob**]

Chair: J.C. Carrega

G. Chevalier, The Orthomodular Poset of Projections of a Lattice

G. Hofer-Szabó, M. Rédei, Reichenbachian Common Cause Systems

J. Harding, M. Navara, Quantum Logics with Given Centers, State Spaces and Automorphism Groups

ROOM B

8.45-10.15 [**Comp**]

Chair: G. Castagnoli

B. D'Hooghe, J. Pykacz, R.R. Zapatrin, Quantum Computation of Fuzzy Numbers

V.A. Bubovich, A.A. Grib, A.Y. Vlasov, Quantum Computation in Terms of Weights on Graphs

D. Finkelstein, Crossing the Quantum Divide

10.45 *Excursion to Ravenna*

21.00 General Assembly

Thursday, April 5

ROOM A

8.45-9.45 [**Alg**]

Chair: E. Beltrametti

B. Legan, R. Greechie, On a Structure Theory for Commutator-Finite Orthomodular Lattices

J.C. Carrega, R. Mayet, Orthomodular Lattices of Subspaces obtained from Quadratic Forms

10-11 [**Alg**]

Chair: Z. Riečanová

D. Aerts, B. D’Hooghe, The Role of Potentiality States and Quantum Structure in Emergent Phenomena

D. Aerts, D. Deses and A. Van der Voorde, Classicality and Connectedness for State Property Systems and Closure Spaces

11-11.30
Coffee Break

11.30-12.30 [**Alg**]

Chair: S. Bugajski

B. Coecke, Intuitionistic and Dynamic Quantum Logic

S. Smets, The Logic of Propagating Properties

ROOM B

8.45-9.45 [**Int**]

Chair: L. Levitin

F. Laudisa, Relations and Correlations in Quantum Mechanics

S.N. Mayburov, Quantum Information, Self-Measurement and State Collapse

10-11 [**Prob**]

Chair: J. Tkadlec

M. Matvejchuk, On a Measure on the Inductive Limit of Hyperbolic Logics

D.H. Mushtari, Remarks on Measures on Orthogonal Rational Projections

11-11.30
Coffee Break

11.30-12.30 [**Comp**]

Chair: B. D'Hooghe

P. Zanardi, R.R. Zapatin, Algebraic Aspects of Entanglement in Quantum Registers

G. Diambrini Palazzi, An Experiment for Detecting Macroscopic Quantum Coherence and its Possible Application to Quantum Computing

ROOM A

15.00-16.00 [**Comp**]

Chair: M. Drieschner

G. Castagnoli, D. Finkelstein, Non-algorithmic Quantum Computation

R. Lupacchini, Probabilities, Complex Numbers and Quantum Gates

16.15-17.15 [**Unsh-Prob**]

Chair: J. Hamhalter

E. Beltrametti, S. Bugajski, Conditional Probability and the Two-Slit Experiment

R. Greechie, S. Gudder, Sequential Effect Algebras

17.15-17.45
Coffee Break

ROOM B

15.00-16.00 [**Prob**]

Chair: R. Mayet

Z. Riečanová, States and Valuations on Effect Algebras

O. Nááasiová, Principle Conditioning

ROOM A

17.45-18.45

Invited lecture

Chair: A. Dvurečenskij

J. Harding, Free Orthomodular Lattices

20.00 **Farewell Banquet**