

Biennial Meeting of the International Quantum Structures Association “QS Leicester 2016”

Leicester, July 11-15, 2016

Organized by:

- School of Management and Institute for Quantum Social and Cognitive Science (IQSCS), University of Leicester (United Kingdom)
- Department of Physics and Astronomy, University of Leicester (United Kingdom)

Committees

Local organizers

- Lisa Brant (Department of Physics and Astronomy)
- Tom Hands (Department of Physics and Astronomy)
- Emmanuel Haven (School of Management and IQSCS)
- Derek Raine (Department of Physics and Astronomy and Centre for Interdisciplinary Science)
- Terry Robinson (Department of Physics and Astronomy)
- Sandro Sozzo (School of Management and IQSCS)

Program committee

- Paul Busch (University of York, United Kingdom)
- Ivan Chajda (Palacky University, Czech Republic)
- Roberto Giuntini (University of Cagliari, Italy)
- Richard Greechie (Louisiana Tech University, United States)
- Stanley Gudder (University of Denver, United States)
- John Harding (New Mexico State University, United States)
- Lev B. Levitin (Boston University, United States)
- Mazanao Ozawa (Nagoya University, Japan)
- Jan Paseka (Masaryk University, Czech Republic)
- Sylvia Pulmannova (Slovak Academy of Sciences, Slovak Republic)
- Zdenka Riecanova (Slovak University of Technology, Slovak Republic)
- Frank Schroeck (University of Denver, United States)
- Sonja Smets (University of Amsterdam, Netherlands)
- Sandro Sozzo (University of Leicester, United Kingdom)
- Karl Svozil (University of Wien, Austria)
- Thomas Vetterlein (Medical University of Vienna, Austria)

SUNDAY JULY 10

17.00-20.00 **Registration**

Conference programme

MONDAY JULY 11

Morning session 1. Room: Oak, Chair: E. Haven

8.30-9.00 **Professor Zoe Radnor, Dean of the School of Management, welcomes “QS 2016. Leicester”**

9.00-10.00 **Keynote lecture** P. Grangier (with A. Auffèves), *Contexts, systems and modalities: A new ontology for quantum mechanics*

10.00-10.30 J. Harding, *Automorphisms of decompositions*

10.30-11.00 **Coffee break**

Morning session 2. Room: Oak, Chair: J. Harding

11.00-11.30 M. Navara, *Structure of orthoalgebras*

11.30-12.00 P. Ptak, M. Matousek, *Orthocomplemented posets (lattices) with a symmetric difference*

12.00-12.30 P. Elias, R. Fric, *Factorizing observables*

12.30-14.00 **Lunch**

Afternoon session 1A. Room: Oak, Chair: M. Navara

14.00-14.30 I. Chajda, J. Paseka, *Transition operators assigned to physical systems*

14.30-15.00 J. Paseka, I. Chajda, *Transition operators and transition relations*

15.00-15.30 M. Bohata, *Plichko spaces and preduals of von Neumann algebras*

Afternoon session 1B. Room: Chestnut, Chair: D. Raine

14.00-14.30 E. Levi, P. Kirton, B. Lovett, *Spin ladders as channels for entanglement distribution between NV centres*

14.30-15.00 J. Korbicz, *Emergence of objectivity and spectrum broadcast structures in models of decoherence*

15.00-15.30 J. Sharp, *The emergence of quantum mechanics from a non-local Lorentz invariant spacetime*

15.30-16.00 **Coffee break**

Afternoon session 2A. Room: Oak, Chair: J. Paseka

16.00-16.30 J. Kühr, I. Chajda, R. Halas, *The varietal join of MV-algebras and orthomodular lattices*

16.30-17.00 S. Pulmannova, *Halmos' SC-decomposition theorem in synaptic algebras*

17.00-17.30 J. Tkadlec, *Properties of effect algebras*

17.30-18.00 S. Haliullin, *Contiguity of states on Neumann algebras*

Afternoon session 2B. Room: Chestnut, Chair: T. Robinson

- 16.00-16.30 G. S. Staples, *Traces of graph-induced operators on fermions and zeons*
- 16.30-17.00 W. Sulis, *A process algebra model of quantum electrodynamics*
- 17.00-17.30 D. Benrabia, M. Hachemane and M. Bouatou, *Positive definite stochastic probability density and decoherence*
- 17.30-18.00 A. Athanassoulis, *Smoothness, boundary conditions and dispersive estimates: The physics of function spaces*

TUESDAY JULY 12

Morning session 1. Room: Oak, Chair: S. Sozzo

- 9.00-10.00 **Keynote lecture** A. Kissinger, *Diagrammatic reasoning for quantum theory*
- 10.00-10.30 S. Gudder, *Discrete scalar quantum field theory*
- 10.30-11.00 **Coffee break**

Morning session 2A. Room: Oak, Chair: R. Giuntini

- 11.00-11.30 A. Baltag, S. Smets, *Reasoning about classical and quantum interactions*
- 11.30-12.00 S. R. Rad, E. Shirinkalam, S. Smets, *Deriving the correctness of quantum voting protocols in the probabilistic logic of quantum programs*
- 12.00-12.30 K. Kishida, S. R. Rad, J. Sack, S. Zhong, *Equivalence between Hilbert lattices and quantum dynamic algebras*

Morning session 2B. Room: Chestnut, Chair: E. Turilova

- 11.00-11.30 K. Bolonek-Larson, *Bell inequalities and a failed symmetry*
- 11.30-12.00 O. Nanasiova, J. Pykacz, L. Valaskova, *Bell inequalities via s -maps*
- 12.00-12.30 P. Frackiewicz, J. Pykacz, *Strong isomorphism in quantum normal form games*
- 12.30-14.00 **Lunch**

Afternoon session 1A. Room: Oak, Chair: S. Pulmannova

- 14.00-14.30 D. Aerts, M. Sassoli de Bianchi, S. Sozzo, *Extending the quantum formalism to solve the measurement and entanglement problems*
- 14.30-15.00 W. Spring, *Quantum distributed systems*
- 15.00-15.30 H. Podsedkowska, A. Luczak, *Properties of Segal's entropy for general quantum system*
- 15.30-16.00 K. Kielanowicz, A. Luczak, *Spectral properties of quantum Markov semigroups*

Afternoon session 1B. Room: Chestnut, Chair: S. Smets

- 14.00-14.30 J. Rachunek, D. Salounova, *Derivations on algebras of a non-commutative generalization of the Lukasiewicz logic*
- 14.30-15.00 M. Hroch, *Concerning concrete quantum logics with a symmetric difference*
- 15.00-15.30 G. Battilotti, *First order language and its constraints*
- 15.30-16.00 D. Krüml, *On axioms of q -topology*
- 16.00-16.30 **Coffee break**
- 16.30-18.30 **General Assembly**

WEDNESDAY JULY 13

Morning session 1. Room: Oak, Chair: P. Busch

- 9.00-10.00 **Keynote lecture** M. Pusey, *Thoughts on a qubit from the perspective of generalised probabilistic theories*
- 10.00-10.30 M. L. Dalla Chiara, R. Giuntini, R. Leporini, G. Sergioli, *Qudit-spaces and a many-valued approach to quantum computational logics*
- 10.30-10.45 **Coffee break**

Morning session 2A. Room: Oak, Chair: J. Pykacz

- 10.45-11.15 R. Giuntini, A. Ledda, F. Paoli, *A new view of effects in a Hilbert space*
- 11.15-11.45 S. Bonzio, I. Chajda, A. Ledda, *Representing quantum structures as near semi-rings*
- 11.45-12.15 R. Venkatrama, G. Sergioli, *Fuzzy representation of Fredkin gate for a conservative quantum computational logic with mixed states*

Morning session 2B. Room: Chestnut, Chair: D. Raine

- 10.45-11.15 M. Papco, R. Fric, *On probability domains IV*
- 11.15-11.45 E. Turilova, J. Hamhalter, *Transformations preserving spectral order*
- 11.45-12.15 T. Fritz, M. Leifer, *Plausibility measures on test spaces*

Excursion to Warwick Castle and Great Central Railway

- 12.15 *Collect packed lunch from College Court*
- 13.00 *Coach departs College Court for Warwick Castle*
- 14.00-17.00 **Visiting Warwick Castle**
- 17.00 *Coach departs Warwick Castle for Great Central Railway*
- 18.00 *Coach arrives at Great Central Railway*
- 18.00-22.30 **Dinner served on a steam train – Great Central Railway**
- 22.30 *Coach departs Great Central Railway for College Court*

THURSDAY JULY 14

Morning session 1. Room: Oak, Chair: J. Harding

- 9.00-10.00 **Birkhoff-von Neumann Prize Lecture** M. Mueller, *Interference, spacetime, and the structure of quantum information*
- 10.00-11.00 **Birkhoff-von Neumann Prize Lecture** P. Perinotti, *Quantum theory and information processing*
- 11.00-11.30 **Coffee break**

Morning session 2A. Room: Oak, Chair: S. Sozzo

- 11.30-12.00 C. Garola, *A pragmatic interpretation of quantum logic*
- 12.00-12.30 J. Pykacz, *The problem of conjunction and disjunction in quantum logics*

Morning session 2B. Room: Chestnut, Chair: T. Robinson

- 11.30-12.00 C. De Ronde, *Quantum superpositions and the representation of physical reality beyond measurement outcomes and mathematical structures*
- 12.00-12.30 G. Nisticò, *On the group theoretical approach to the Quantum Theory of an interacting particle*
- 12.30-14.00 **Lunch**

Symposium “Tribute to Peter Mittelstaedt”

(Organizers: P. Busch and M. L. Dalla Chiara)

Afternoon session 1. Room: Oak, Chair: M. L. Dalla Chiara

- 14.00-15.00 P. Busch, *The two faces of Heisenberg’s uncertainty principle*
- 15.00-16.00 B. Falkenburg, *Reduction and the reconstruction of modern physics*
- 16.00-16.30 **Coffee break**

Afternoon session 2. Room: Oak, Chair: B. Falkenburg

- 16.30-17.30 E. Beltrametti, M. L. Dalla Chiara, R. Giuntini, *The quantum logical challenge: Peter Mittelstaedt’s contributions to logic and philosophy of science*
- 17.30-18.30 A. Dvurecenski, *TBA*

FRIDAY JULY 15. Symposium “Quantum Structures Outside Physics”

(Organizers: E. Haven and S. Sozzo)

Morning session 1. Room: Oak, Chair: S. Sozzo

9.00-10.00 **Keynote lecture** E. M. Pothos, *The quantum cognition research programme: An introduction*

10.00-10.30 E. Haven, *A possible economics interpretation of the amplitude function*

10.30-11.00 **Coffee break**

Morning session 2. Room: Oak, Chair: F. Bagarello

11.00-11.30 D. Aerts, M. Sassoli de Bianchi, S. Sozzo, *Quantum cognition beyond Hilbert space: Fundamentals and applications*

11.30-12.00 C. Moreira, A. Wichert, *When to use quantum probabilities in quantum cognition: A discussion*

12.00-12.30 P. Ballonoff, *States of cultural systems*

12.30-14.00 **Lunch**

Afternoon session. Room: Oak, Chair: E. Haven

14.00-14.30 F. Bagarello, *Operators, Heisenberg dynamics and politics*

14.30-15.00 F. Gargano, *Quantum interactions in modeling political alliances*

15.00-15.30 R. Di Salvo, F. Oliveri, *Quantum dynamics of political party groups and the role of turncoats*

15.30-16.00 F. Oliveri, R. Di Salvo, *An operatorial model of interplay between politicians' turncoat habits in central and local governments*

16.00-16.30 **Thanks and closing**