

PHYSICS AND REALITY, University of Helsinki, 4-6 June 2024

DAY 0, MONDAY, JUNE 3RD, 2024

OPTIONAL PRE-CONFERENCE EVENT in the House of Science and Letters (“Tieteiden talo”), address: Room 104, street level, Kirkkokatu 6, 00170 Helsinki:

18.00 – 19.45 **Martín Lopéz Corredoira** *Instituto de Astrofísica de Canarias, ES*
The Twilight of the Scientific Age: A Lecture on the Sociology of Science

ALL CONFERENCE TALKS will be in Room PIII, Porthania building, street level, University of Helsinki, Yliopistonkatu 3, 00100 Helsinki.

DAY 1 TUESDAY, JUNE 4TH, 2024

8:00 – 9:00 REGISTRATION

9:00 – 9:10 WELCOME

Kai Nordlund *Vice Rector, University of Helsinki, FI*
Paavo Pylkkänen *University of Helsinki, FI*
Avril Styrman *University of Helsinki, FI*

TOPIC 1 INTERPRETING THE QUANTUM THEORY

9:10 – 9:40 **Paavo Pylkkänen** *University of Helsinki, FI*
Quantum Theory and Reality: The Philosophical Options

9:40 – 10:10 **Bert Kappen** *Radboud University, NL*
Solving the measurement problem in the context of open quantum systems

10:10 – 10:40 **Tarja Kallio-Tamminen** *Physics Foundations Society, FI*
The Content of Planck’s Constant: What does the connection between Planck’s quantum and Maxwell’s equations reveal?

10:40 – 10:50 BREAK

10:50 – 11:50 **KEYNOTE David Wallace** *University of Pittsburgh, USA*
The sky is blue, and other reasons there is no underdetermination in quantum theory

11:50 – 13:00 LUNCH BREAK

13:00 – 14:00 **Basil Hiley** *University College London, UK*
An algebraic approach to quantum theory

14:00 – 14:30 **Petri Lievonon** *Screen.io, FI*
TBA

14:30 – 14:50 COFFEE BREAK 20 MINUTES

14:50 – 15:20 **Vikram Athalye** *Cummins College Pune, IN*

On the Pursuit of Universal Consistency: Interpreting Physics *as* Reality

15:20 – 15:50 **Marja-Liisa Kakkuri-Knuuttila** *Aalto University, FI*
Energy as the Basis of a Unified Theory of Physics: Neo-Aristotelian Reflections

15:50 – 16:00 BREAK 10 MINUTES

16:00 – 18:00 **CONTRIBUTED TALKS:**

16:00 – 16:15 **Michael Silberstein & Mark Stuckey** *Elizabethtown College, USA*
Unifying Relativity and Quantum Mechanics via Adynamical Global Constraints

16:15 – 16:30 **Ovidiu Cristinel Stoica** *Horia Hulubei National Institute of Physics and Nuclear Engineering Bucharest, RO*

The Underdeterminacy of the Correspondence Between Operators and Their Physical Meaning in Structural Realism

16:30 – 16:45 **Jørn Kløvfjell Mjelva** *University of Oslo, NO*

Hypersurface-dependent State Descriptions in Relativistic Collapse Theories

16:45 – 17:00 **Enrico Maresca** *Universities of Florence and Pisa, IT*

Noncommutative Geometry and Spacetime: An Historical Reconstruction

17:00 – 17:15 **Gerd Krizek**, *Institute of Digital Sciences Linz, AT* & **Flavio Del Santo** *University of Geneva, CH*

Against the “nightmare of a mechanically determined universe”: Why Bohm was never a Bohmian

17:15 – 17:30 **Ada Köprülüler & Özgür Aydın** *Boğaziçi University Istanbul, TR*

Could Entropy be the Missing Link in David Bohm’s Metaphysics?

17:30 – 17:45 **José Alejandro Fernández Cuesta** *Complutense University of Madrid*, **Michele Piazzai** *Carlos III University of Madrid* & **Umberto Riveccio** *National University of Distance Education, ES*

Quantum Formalism Outside Physics: From Quantum Logics to Quantum Cognition

17:45 – 18:00 **Jamie Gilchrist** *Bristol University, UK*

Metaphysical Coherentism and Quantum Entanglement

18:00 – 20:00 POSTER SESSION WITH SALAD AND DRINKS

DAY 2 WEDNESDAY, JUNE 5TH, 2024

TOPIC 2 DYNAMICAL APPROACHES TO RELATIVITY

9:00 – 9:45 **Martín Lopéz Corredoira** *Instituto de Astrofísica de Canarias, ES*
Alternative cosmologies

9:45 – 10:45 **Tuomo Suntola** *Physics Foundations Society, FI*
The Dynamic Universe (DU)

10:45 – 11:05 COFFEE BREAK 20 MINUTES

11:05 – 12:00 **Michal Krizek** *Czech Academy of Sciences Prague, CZ*
Infrared measurements of the JWST suggest that our dynamic universe is spatially closed

12:00 – 13:00 **LUNCH BREAK**

13:00 – 14:00 **KEYNOTE Silvia de Bianchi** *Università degli Studi di Milano, IT*
The Quest for a Unified Theory: Incompleteness and Progress in Physics

14:00 – 14:45 **Avril Styrman** *University of Helsinki, FI*
Evaluation of Theories and Methodologies: Relativistic Physics vs. the Dynamic Universe

14:45 – 15:05 COFFEE BREAK 20 MIN

15:05 – 15:50 **Karen Crowther** *University of Oslo, NO*
Quantum Gravity

15:50 – 16:00 BREAK 10 MIN

16:00 – 18:00 **CONTRIBUTED PAPERS:**

16:00 – 16:15 **Siddhart Muthukrishnan** *University of Pittsburgh, USA*
Unpacking Black Hole Complementarity

16:15 – 16:30 **Álvaro Mozota Frauca** *Autonomous University of Barcelona, ES*
Quantum Cosmology and the Age of the Universe

16:30 – 16:45 **Anastasiia Lazutkina** *University of Wuppertal, DE*
Meta-empirical theory assessment in contemporary cosmology: The MOND and dark matter debates

16:45 – 17:00 **Juha Himanka** *University of Lapland, FI*
Husserl and Einstein on Earth and Ether

17:00 – 17:15 **Alexander Niederklapfer** *London School of Economics, UK*
What is Fundamental in Fundamental Physics?

17:15 – 17:30 **Petri Turunen, Ilkka Pättiniemi & Johan Hietanen** *University of Helsinki and The Helsinki Circle, FI*
On the Very Idea of an Interpretation of Quantum Mechanics

17:30 – 17:45 **Ilkka Pättiniemi** *The Helsinki Circle, FI*
Frank on Physics and Reality

17:45 – 18:00 **Tuomas Pernu** *University of East Finland, FI*
Is There Causation in Physics?

18:15 – 19:45 UNIVERSITY OF HELSINKI RECEPTION
Main building of the University of Helsinki, room CHRISTINA (U2085), address Unioninkatu 34, 2nd floor.

DAY 3 THURSDAY, JUNE 6TH, 2024

TOPIC 3 METAPHYSICS, QUANTUM THEORY AND APPLICATIONS TO NEW DOMAINS

9:00 – 9:40 **Tuomas Tahko** *Bristol University, UK*
Mapping the Space of Scientific Possibility

9:40 – 10:10 **Marilu Chiofalo** *University of Pisa, IT*

A Quantum Toolbox for Neurobiological Sensory Systems

10:10 – 10:40 **Ron Chrisley** *University of Sussex, UK*
Quantum-like Models of Perception

10:40 – 11:00 COFFEE BREAK 20 MINUTES

11:00 – 12:00 **KEYNOTE Tim Palmer** *University of Oxford, UK*
The Singular Role of Infinity in Quantum Physics: Towards a Rational Theory of Quantum Mechanics

12:00 – 13:00 **LUNCH BREAK**

13:00 – 13:40 **Hans Liljenström** *Agora for Biosystems, SWE*
Can Physics and Neuroscience Allow for Free Will?

13:40 – 15:10 **FINAL PANEL DISCUSSION**

15:10 – 15:30 COFFEE BREAK 20 MINUTES

15:30 – 17:45 **CONTRIBUTED PAPERS:**

15:30 – 15:45 **Margarida Hermida** *King's College London, UK*
From Quantum Tunnelling to Sex

15:45 – 16:00 **Alessandra Pulga** *University of Groningen, NL*
A Framework for Free Will within a Quantum Universe

16:00 – 16:15 **Bixin Guo** *University of Pittsburgh, USA*
Next Best Thing—What Can Quantum Mechanics Tell Us About the Fundamental Ontology of the World?

16:15 – 16:30 **Sami Tayub** *Bristol University, UK*
How van Fraassen inadvertently showed that Metaphysics can be Tested: Lessons from Bell's Theorem

16:30 – 16:45 **Anton Sverdlikov** *University of Wuppertal, DE*
Event Structural Realism

16:45 – 17:00 **Saara Wuokko** *University of Helsinki, FI*
Retrocausality and Perspectivism

17:00 – 17:15 **Christabel Cane** *University College London, UK*
The Problem(s) of Temporary Intrinsic

17:15 – 17:30 **Luca Gasparinetti** *Università della Svizzera Italiana, CH*
Time, Causation and Quantum Gravity: a First Assessment

17:30 – 17:45 **Tannaz Najafi** *Universities of Lisbon, PT and Geneva, CH*
Becoming and the Illegitimate Child of Substantivalism and Relationalism

Optional: Conference dinner