

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

Programme 2024-06-01 version

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

8:15 – 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

Chair: Avril Styrman

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 – 11:00 COFFEE BREAK 20 MINUTES

Chair: Paavo Pylkkänen

11:00 – 12:00 **KEYNOTE David Wallace** *University of Pittsburgh, USA*
The sky is blue, and other reasons there is no underdetermination in quantum theory

12:00 – 13:00 LUNCH BREAK

Chair: Tarja Kallio-Tamminen

13:00 – 13:30 **Vikram Athalye** *Cummins College Pune, IN*
On the Pursuit of Universal Consistency: Interpreting Physics *as* Reality

13:30 – 14:00 **Marja-Liisa Kakkuri-Knuuttila** *Aalto University, FI*
Energy as the Basis of a Unified Theory of Physics: Neo-Aristotelian Reflections

14:00 – 14:30 **Petri Lievonen** *Screen.io, FI*
Visual Introduction to Clifford Algebras and Spherical Geometries: Towards Unification Proposals by Suntola

14:30 – 15:00 COFFEE BREAK 30 MINUTES

15:00 – 16:00 **Basil Hiley** *University College London, UK (online talk)*
The Algebraic Way to Relativistic Quantum Theory

16:00 – 16:10 BREAK 10 MINUTES

16:10 – 17:55 **CONTRIBUTED TALKS**

Chair: Alex Carruth

16:10 – 16:25 **Michael Silberstein & Mark Stuckey** *Elizabethtown College, USA*
Unifying Relativity and Quantum Mechanics via Adynamical Global Constraints

16:25 – 16:40 **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

16:40 – 16:55 **Jørn Kløvfjell Mjelva** *University of Oslo, NO*
Hypersurface-dependent State Descriptions in Relativistic Collapse Theories

16:55 – 17:10 **Enrico Maresca** *Universities of Florence and Pisa, IT*
Noncommutative Geometry and Spacetime: An Historical Reconstruction

17:10 – 17:25 **Ada Köprülüler & Özgür Aydin** *Boğaziçi University Istanbul, TR*
Could Entropy be the Missing Link in David Bohm's Metaphysics?

17:25 – 17:40 **José Alejandro Fernández Cuesta** *Complutense University of Madrid*, **Michele Piazzai** *Carlos III University of Madrid* & **Umberto Riviaccio** *National University of Distance Education, ES*
Quantum Formalism Outside Physics: From Quantum Logics to Quantum Cognition

17:40 – 17:55 **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

Chair: Petri Lievonen

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 CONFERENCE PHOTO AND LUNCH BREAK

Chair: Paavo Pylkkänen

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 MINUTES

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

15:50 – 16:00 BREAK 10 MINUTES

16:00 – 18:00 **CONTRIBUTED TALKS**

Chair: Saara Wuokko

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

Chair: Alex Carruth

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*
Non-superpositional neural computation and the foundations of mentality: A re-assessment

10:40 – 11:00 COFFEE BREAK 20 MINUTES

Chair: Marilu Chiofalo

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 (online talk)*
Can Physics and Neuroscience Allow for Free Will?

Chair: Paavo Pylkkänen

13:40 – 15:10 **FINAL PANEL DISCUSSION: Opening statements (5-10 min) by Silvia De Bianchi, Tim Palmer, and David Wallace. Brief comments and questions by Marilu Chiofalo, Ron Chrisley, Karen Crowther, Bert Kappen, Michal Krizek, Tuomo Suntola and Tuomas Tahko. Questions from Audience.**

15:10 – 15:30 COFFEE BREAK 20 MINUTES

15:30 – 17:30 **CONTRIBUTED TALKS**

Chair: Ron Chrisley

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 (online talk)*
The Problem(s) of Temporary Intrinsic
- 17:15 – 17:30 **Luca Gasparinetti** *Università della Svizzera Italiana, CH (online talk)*
Time, Causation and Quantum Gravity: a First Assessment

OPTIONAL: CONFERENCE DINNER 19:30->.

Restaurant Suomenlinnan Panimo (Suomenlinna Brewery), Suomenlinna C 1, 00190 Helsinki. Suomenlinna Sea Fortress is only a 15-minute ferry ride from Helsinki Market Square (Kauppatori). The restaurant is just beside the main dock of Suomenlinna.