



Seminar: Topics in Philosophy of Physics

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Spring 2025

Website: http://wuthrich.net/teaching/_USI_PhilPhysSem_2025.html

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The philosophy of physics deals with methodological, epistemological, and metaphysical issues in physics. This seminar addresses topics in the philosophy of space and time as they relate to physics, the philosophical implications of quantum physics, the physical origin of the direction of time, or issues in the philosophy of cosmology and the philosophy of quantum gravity.

For the spring semester 2025, the topics are (1) naturalism and the methodology of metaphysics, (2) naturalistic challenges to accounts of laws of nature and modality, (3) quantum non-locality and its philosophical implications, and (4) philosophical debates surrounding the quantum measurement problem.

The readings are available at icorsi at <https://www.icorsi.ch/course/view.php?id=20600>.

Prerequisites. Participants should have successfully completed the course *Introduction to Philosophy of Physics*, or be similarly prepared.

Course requirements and evaluation

My expectation is that everyone prepares the assigned readings ahead of time, actively participates in the seminar, and accepts a reasonable share of presentation duties. As this is a seminar rather than a lecture course, the grade will be determined by the points obtained from the following type of evaluation:

1. *Seminar presentation(s)* (8 points): Each participant will give at least one seminar presentation (see below).
2. *Seminar participation* (2 points): For each topic apart from the first, every participant is to send me by email one (or two) discussion questions (no more than a paragraph) on any one of the papers of the corresponding topic by midnight before the day we discuss the topic (i.e., by 31 March, 13 April, and 14 April), for a credit of up to half a point per topic. The remaining half point for participation will be given based on class participation.

Please let me know in advance if you are unable to participate, e.g., because of an emergency or if you are sick.

Seminar presentations

I expect everyone to do (at least) one presentation on one of the assigned readings. When it is your turn, please keep the following points in mind:

- While you will be the leader for the entire half-seminar on this day, including the discussion, the initial presentation should last (if given in one piece) no more than 30 to 35 minutes.
- It is important to stick to the main points, the author's main thesis and their main argument, rather than to give a complete or chronological list of points raised in the article.
- I encourage you to use some visual complement (blackboard, powerpoint slides, hand-out), and to see this seminar as an opportunity to get some experience with this.
- Make sure to read the article sufficiently ahead of time, so that we have time to make an appointment if you want to meet and discuss it before your presentation.
- Do not stress out if there is something in the article you do not understand after having made an effort to grasp it. In this case, try to articulate precisely what it is that you don't understand—and it may well become the topic of our seminar discussion.
- In this sense, it is not the job of the presenter to offer a conclusive analysis of a paper; rather, it is to prepare the ground for our discussion.
- You should, however, raise at least some critical points to be discussed.

Tentative schedule

(1) Introduction, and naturalism and the methodology of metaphysics

Monday, 31 March 2025, 11:30-13:00 and 14:30-18:00

- E J Lowe. The rationality of metaphysics. *Synthese* **178** (2011): 99-109.
- Matteo Morganti and Tuomas E Thako. Moderately naturalistic metaphysics. *Synthese* **194** (2017): 2557-2580.
- Amanda Bryant. Keep the chickens cooped: the epistemic inadequacy of free range metaphysics. *Synthese* **197** (2020): 1867-1887.
- Kerry McKenzie. Science-guided metaphysics. In Ricki Bliss and J T M Miller (eds.), *The Routledge Handbook to Metametaphysics*. Routledge (2021), 435-446.
- George Darby. Entanglement and the metaphysician on the Clapham omnibus. *Topoi* **34** (2015): 387-396.

(2) Naturalistic challenges to accounts of laws of nature and modality

Tuesday, 1 April 2025, 09:30-13:00 and 14:30-16:00

- Tim Maudlin. *The Metaphysics Within Physics*. Oxford University Press (2007), chapter 2 ('Why be Humean?'), 50-77.
- Mauro Dorato and Michael Esfeld. The metaphysics of laws: dispositionalism vs primitivism. In Tomasz Bigaj and Christian Wüthrich (eds.), *Metaphysics in Contemporary Physics*. Brill (2015), 403-424.
- Alastair Wilson. Four grades of modal naturalism. *Proceedings of the Aristotelian Society* **124** (2024): 115-137.
- Amanda Bryant and Alastair Wilson. *Modal Naturalism: Science and the Modal Facts*. Cambridge University Press (2024), §1-§3, 1-22.
- Amanda Bryant and Alastair Wilson. *Modal Naturalism: Science and the Modal Facts*. Cambridge University Press (2024), §4-§6, 22-41.

(3) Quantum non-locality and its philosophical implications

Monday, 14 April 2025, 11:30-13:00 and 14:30-18:00

- Christian Wüthrich. When the actual world is not even possible. In George Darby, David Glick, and Anna Marmodoro (eds.), *The Foundation of Reality: Fundamentality, Space and Time*. Oxford University Press (2020), 233-253.
- Tim Maudlin. What Bell did. *Journal of Physics A: Mathematical and Theoretical* **47** (2014): 424010.
- Alyssa Ney. *The World in the Wave Function*. Oxford University Press (2021), §2.1-§2.4, 49-67.
- Alyssa Ney. *The World in the Wave Function*. Oxford University Press (2021), §2.5-§2.8, 67-79.
- Alyssa Ney. *The World in the Wave Function*. Oxford University Press (2021), §3.1-§3.4, 80-96.

(4) The quantum measurement problem

Tuesday, 15 April 2025, 09:30-13:00 and 14:30-16:00

- Valia Allori. Wave-functionalism. *Synthese* **199** (2021): 12271-12293.
- David Wallace. Lessons from realistic physics for the metaphysics of quantum theory. *Synthese* **197** (2020): 4304-4318.
- David Wallace. The sky is blue, and other reasons quantum mechanics is not underdetermined by evidence. *European Journal for Philosophy of Science* **13** (2023): 54.
- John Hawthorne. A metaphysician looks at the Everett interpretation. In Simon Saunders, Jonathan Barrett, Adrian Kent, and David Wallace (eds.), *Many Worlds? Everett, Quantum Theory, and Reality*. Oxford University Press (2010), 144-153.
- James Ladyman. Reply to Hawthorne: physics before metaphysics. Same collection, 154-160.