IPP Reading List

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This is my reading list for the FHS course 'Intermediate Philosophy of Physics'. I am indebted to Adam Caulton and James Read for much of the material on it (and some of the essay questions). A few preliminaries on how this reading list works:

- This reading list assumes the equivalent of a first course in SR and QM.
- 'Core' reading is compulsory. (*But* there is no need to cite a 'core' paper if you don't end up using it in your essay.)
- Items on the 'additional' reading (where I have provided it) are directly relevant to the essay question(s) provided, but not compulsory. Items on the 'further' reading (where I have provided it) are intended to provide additional material which may or may not be directly relevant to your essay (but may be relevant to future exam questions!), or to highlight some of the more recent literature on issues related to the topic, or to highlight some historical background on that topic. Almost all the 'further' papers should be intelligible to most second- or third-year undergraduates; where a paper has more advanced (likely mathematical) prerequisites than those listed above I have flagged it.
- For some of the topics, I have provided multiple essay questions. Obviously you should choose one (and only one); however, I encourage you to think (whilst you are doing the reading) about *why* I have chosen to distinguish these questions.

I have tried to provide DOIs for all items on this list where they exist; any issues locating an item, as well as questions, comments, or suggestions, can be directed to me at eleanor.march@philosophy.ox.ac.uk.

Some advice on choosing topics

I have provided fourteen (14) topics in all, of which you should choose four (4) SR topics and four (4) QM topics. Which topics you choose will depend on your interests and what you want to get out of this course. Of course, part of the aim of this course is to prepare you for an exam (and the selection of exam questions remains fairly stable year on year).

I would like to emphasise that it is perfectly possible both to maximise the number of questions open to you on the exam *and* cover pretty much any selection of topics in tutorials, *if* you are happy to study a topic whilst knowing that you are much less likely revise it for the exam. (In which case, the list below should provide some guidance on how to do this.) However, if your primary concern is to maximise the number of exam questions available to you, *without* knowing in advance which ones you are more likely to revise, I would suggest the following:

- Newton's laws
- The conventionality of simultaneity
- Dynamical and geometrical approaches to spacetime
- One of: the Lorentz transformations, the twins paradox, frame-dependent effects, presentism, gravitation and the equivalence principle(s)
- The measurement problem
- EPR and Bell's theorem
- One of: de Broglie-Bohm theory, collapse theories
- One of: the Everett interpretation: probability, the Everett interpretation: ontology

  N.B. I have separated these topics to keep the reading manageable for your essays, however, if you choose to revise this topic I would suggest doing at least some of the core reading for both of these as it is highly variable which comes up.

Newton's laws

'Newton's first law is just a definition of 'inertial frame', and Newton's second law is just a definition of 'force'. So Newton's first two laws have no empirical content.' Discuss.

Core

- Read, James (2023). *Special Relativity*. Cambridge: CUP. `https://doi.org/10.1017/9781009300599`. ch. 1
- Hoek, Daniel (2023). "Forced Changes Only: A New Take on the Law of Inertia." *Philosophy of Science* 90 (1): pp. 60-76. `https://doi.org/10.1017/psa.2021.38`.
- Brown, Harvey R. (2006). *Physical Relativity*. chs. 2.2 & 3.1-3.2
- Friedman, Michael (1983). *Foundations of Space-Time Theories*. Princeton, NJ: Princeton University Press. `https://doi.org/10.1515/9781400855124`. ch. 3.7 `https://doi.org/10.1080/02698599508573522`.
- Torretti, Roberto (1984). *Relativity and Geometry*. Oxford: Pergamon. ch. 1

Additional

- Anderson, James L. (1990). "Newton's First Two Laws of Motion Are Not Definitions." *American Journal of Physics* 58 (12): pp. 1192-1195. `https://doi.org/10.1119/1.16250`.
- Earman, John and Friedman, Michael (1973). "The Meaning and Status of Newton's Law of Inertia and the Nature of Gravitational Forces." *Philosophy of Science* 40 (3): pp. 329-359. `https://doi.org/10.1086/288536`.
- Pfister, Herbert (2004). "Newton's First Law Revisited." *Foundations of Physics Letters* 17 (1): 49-64. `https://doi.org/10.1023/B:FOPL.0000013003.96640.79`
- Disalle, Robert (1995). "Spacetime Theory as Physical Geometry." *Erkenntnis* 42 (3): pp. 317-337. `https://doi.org/10.1007/BF01129008`.
- DiSalle, Robert. "Space and Time: Inertial Frames." In *The Stanford Encyclopedia of Philosophy* (Winter 2020 Edition), edited by Edward N. Zalta. `https://plato.stanford.edu/archives/win2020/entries/spacetime-iframes/`.

Further

- Barbour, Julian (2001). *The Discovery of Dynamics*. Oxford: OUP. `https://doi.org/10.1093/oso/9780195132021.001.0001`. ch. 12
- Poincaré, Henri (1952). *Science and Hypothesis*. New York, Dover. chs. 6-7
- Nagel, Ernest (1961). *The Structure of Science: Problems in the Logic of Explanation*. New York: Harcourt, Brace & World. ch. 7
- Saunders, Simon (2013). "Rethinking Newton's Principia." *Philosophy of Science* 80 (1): pp. 22-48. `https://doi.org/10.1086/668881`.
- March, Eleanor. "Are Maxwell Gravitation and Newton-Cartan Theory Theoretically Equivalent?" Forthcoming in *The British Journal for the Philosophy of Science*. `https://doi.org/10.1086/730863`.

  Prerequisites: a little differential geometry (as one might encounter in, e.g. a first physics course on GR), familiarity with abstract index and angle brackets notation, a little basic category theory

The Lorentz transformations

Provide a derivation of the Lorentz transformations, making clear all input assumptions and where they are used. Which of these assumptions are empirical facts, and which are conventions?

Core

- Einstein, Albert (1905). "Zur Elekrodynamik Bewegter Körper." Annalen der Physik 17.

  Online translation available at: ***http://www.fourmilab.ch/etexts/einstein/specrel/www/***

- Read, James (2023). *Special Relativity.* Cambridge: CUP. https://doi.org/10.1017/9781009300599. ch. 4

- Brown, Harvey R. (2006). *Physical Relativity.* chs. 3 & 5

- Friedman, Michael (1983). *Foundations of Space-Time Theories.* Princeton, NJ: Princeton University Press. https://doi.org/10.1515/9781400855124. chs. 4.1-4.2 & 4.5 https://doi.org/10.1080/02698599508573522.

- Torretti, Roberto (1984). *Relativity and Geometry.* Oxford: Pergamon. ch. 3

Additional

- Brown, Harvey R. and Sypel, Roland (1995). "On the Meaning of the Relativity Principle and Other Symmetries." *International Studies in the Philosophy of Science* 9 (3): pp. 235-253.

- Torretti, Roberto (1999). *The Philosophy of Physics.* Cambridge: CUP. pp. 249-260

- Cheng, Brian and Read, James" (2021). Why Not a Sound Postulate?" *Foundations of Physics* 51 (3): 72-72. https://doi.org/10.1007/s10701-021-00479-0.

- Shanahan, Daniel (2023). "The Lorentz Transformation in a Fishbowl: A Comment on Cheng and Read's "Why Not a Sound Postulate?"" *Foundations of Physics* 53 (3). https://doi.org/10.1007/s10701-023-00698-7.

- Todd, Scott L. and Menicucci, Nicolas C. (2017). "Sound Clocks and Sonic Relativity." *Foundations of Physics* 47 (10): pp. 1267-1293. https://doi.org/10.1007/s10701-017-0109-0.

The conventionality of simultaneity

Is the simultaneity of spacelike-separated events conventional in special relativity?
OR:
Provide an outline of Malament's 'proof' of the non-conventionality of simultaneity in special relativity, and comment on each of the assumptions. Can any of these reasonably be given up?

Core

- Janis, Allen. "Conventionality of Simultaneity." In *The Stanford Encyclopedia of Philosophy* (Fall 2018 Edition), edited by Edward N. Zalta. https://plato.stanford.edu/archives/fall2018/entries/spacetime-convensimul/.
- Reichenbach, Hans (1958). *The Philosophy of Space and Time.* New York, NY: Dover. chs. 2.19-2.20
- Malament, David (1977). "Causal Theories of Time and the Conventionality of Simultaneity." *Noûs* 11 (3): pp. 293-300. https://doi.org/10.2307/2214766.
- Sarkar, Sahotra and Stachel, John (1999). "Did Malament Prove the Non-Conventionality of Simultaneity in the Special Theory of Relativity?" *Philosophy of Science* 66 (2): pp. 208-220. https://doi.org/10.1086/392684.
- Brown, Harvey R. (2006). *Physical Relativity.* pp. 95-105.

Additional

- Ellis, Brian and Bowman, Peter (1967). "Conventionality in Distant Simulataneity." *Philosophy of Science* 34 (2): pp. 116-136. https://doi.org/10.1086/288136.
- Grünbaum, Adolf (2010). "David Malament and the Conventionality of Simultaneity: A Reply." *Foundations of Physics* 40 (9): pp. 1285-1297. https://doi.org/10.1007/s10701-009-9328-3.
- Winnie, John A. (1970). "Special Relativity without One-Way Velocity Assumptions: Part I." *Philosophy of Science* 37 (1): pp. 81-99. https://doi.org/10.1086/288281.
- Winnie, John A. (1970). "Special Relativity without One-Way Velocity Assumptions: Part II." *Philosophy of Science* 37 (2): pp. 223-238. https://doi.org/10.1086/288296.
- Salmon, Wesley C. (1977). "The Philosophical Significance of the One-Way Speed of Light." *Noûs* 11 (3): pp. 253-292. https://doi.org/10.2307/2214765.

Dynamical vs. geometrical approaches to spacetime

Disambiguate different versions of the dynamical and geometrical approaches to spacetime theories. On what grounds is one approach to be preferred over the other?

Core

- Brown, Harvey R. and Pooley, Oliver (2006). "Minkowski Space-Time: A Glorious Non-Entity." In *The Ontology of Spacetime*, edited by Dennis Dieks. Amsterdam: Elsevier.
- Janssen, Michel (2009). "Drawing the Line between Kinematics and Dynamics in Special Relativity." *Studies in History and Philosophy of Modern Physics* 40 (1): pp. 26-52. https://doi.org/10.1016/j.shpsb.2008.06.004.
- Acuña, Pablo (2016). "Minkowski Spacetime and Lorentz Invariance: The Cart and the Horse or Two Sides of a Single Coin? *Studies in History and Philosophy of Modern Physics* 55: pp. 1-12. https://doi.org/10.1016/j.shpsb.2016.04.002
- Read, James (2020). "Explanation, Geometry, and Conspiracy in Relativity Theory." In *Thinking About Space and Time: 100 Years of Applying and Interpreting General Relativity*, edited by Claus Beisbart et al. Basel: Birkhäuser. https://doi.org/10.1007/978-3-030-47782-0_9.
- Read, James (2020). "Geometrical Constructivism and Modal Relationalism: Further Aspects of the Dynamical/Geometrical Debate." *International Studies in the Philosophy of Science* 33 (1): pp. 23-41. https://doi.org/10.1080/02698595.2020.1813530.

Additional

- Brown, Harvey R. and Read, James (2021). "The Dynamical Approach to Spacetime." In *The Routledge Companion to Philosophy of Physics*, edited by Eleanor Knox and Alistair Wilson. Oxford: Routledge.
- Myrvold, Wayne C. (2019). "How Could Relativity Be Anything Other Than Physical?" *Studies in History and Philosophy of Modern Physics* 67: pp. 137-143. https://doi.org/10.1016/j.shpsb.2017.05.007.
- Weatherall, James Owen (2021). "Two Dogmas of Dynamicism." *Synthese* 199 (suppl. 2): pp. 253-275. https://doi.org/10.1007/s11229-020-02880-0.
- Norton, John D. (2008). "Why Constructive Relativity Fails." *The British Journal for the Philosophy of Science* 59 (4): pp. 821-834. https://doi.org/10.1093/bjps/axn046.

- Stevens, Syman (2020). “Regularity Relationalism and the Constructivist Project.” *The British Journal for the Philosophy of Science* 71 (1): pp. 353-372. `https://doi.org/10.1093/bjps/axx037`.

Further

All the following papers assume some basic knowledge of the mathematics of GR.

- Read, James et al. (2018). “Two Miracles of General Relativity.” *Studies in History and Philosophy of Modern Physics* 64: pp. 14-25. `https://doi.org/10.1016/j.shpsb.2018.03.001`.
- Fletcher, Samuel C. (2020). “Approximate Local Poincaré Spacetime Symmetry in General Relativity.” In *Thinking About Space and Time: 100 Years of Applying and Interpreting General Relativity*, edited by Claus Beisbart et al. Basel: Birkhäuser. `https://doi.org/10.1007/978-3-030-47782-0_12`.
- Fletcher, Samuel C. (2013). “Light Clocks and the Clock Hypothesis.” *Foundations of Physics* 43 (11): 1369-1383. `https://doi.org/10.1007/s10701-013-9751-3`.
- Fletcher, Samuel C. and Weatherall, James Owen (2023). “The Local Validity of Special Relativity, Part 1: Geometry.” *Philosophy of Physics* 1 (1): 7. `https://doi.org/10.31389/pop.6`.
- Fletcher, Samuel C. and Weatherall, James Owen (2023). “The Local Validity of Special Relativity, Part 2: Matter Dynamics” *Philosophy of Physics* 1 (1): 8. `https://doi.org/10.31389/pop.7`.

The twins 'paradox'

What is the best explanation of the time differential in the twins 'paradox'?

Core

- Weiss, Michael. "The Twin Paradox." `http://math.ucr.edu/home/baez/physics/Relativity/SR/TwinParadox/twin_paradox.html`.
- Maudlin, Tim (2012). *Philosophy of Physics: Space and Time*. Princeton, NJ: Princeton University Press. `https://doi.org/10.1515/9781400842339`. ch. 4
- Read, James (2023). *Special Relativity*. Cambridge: CUP. `https://doi.org/10.1017/9781009300599`. ch. 10
- Debs, Talal A. and Redhead, Michael L. G. (1996). "The Twin "Paradox" and the Conventionality of Simultaneity." *American Journal of Physics* 64 (4): pp. 384-392. `https://doi.org/10.1119/1.18252`.
- Weeks, Jeffrey R. (2001). "The Twin Paradox in a Closed Universe." *The American Mathematical Monthly* 108 (7): pp. 585-590. `https://doi.org/10.2307/2695267`.

Frame-dependent effects

In what sense (if any) are frame-dependent effects *physical*? In what sense (if any) are they *explanatory*?

Core

- Bell, John S. (2004). "How to Teach Special Relativity." In *Speakable and Unspeakable in Quantum Mechanics* (2nd edition). Cambridge: CUP.

- Read, James (2023). *Special Relativity*. Cambridge: CUP. `https://doi.org/10.1017/9781009300599`. ch. 9

- Maudlin, Tim (2012). *Philosophy of Physics: Space and Time*. Princeton, NJ: Princeton University Press. `https://doi.org/10.1515/9781400842339`. ch. 5

- Weiss, Michael. "Bell's Spaceship Paradox." `http://math.ucr.edu/home/baez/physics/Relativity/SR/BellSpaceships/spaceship_puzzle.html`.

- Lipman, Martin A. (2020). "On the Fragmentalist Interpretation of Special Relativity." *Philosophical Studies* 177 (1): pp. 21-37. `https://doi.org/10.1007/s11098-018-1178-4`.

Additional

- Slavov, Matias (2020). "Eternalism and Perspectival Realism About the 'Now'." *Foundations of Physics* 50 (11): pp. 1398-1410. `https://doi.org/10.1007/s10701-020-00385-x`.

- Miller, D. J. (2010). "A Constructive Approach to the Special Theory of Relativity." *American Journal of Physics* 78 (6): pp. 633-638. `https://doi.org/10.1119/1.3298908`.

- Fine, Kit (2005). "Tense and Reality." In his *Modality and Tense: Philosophical Papers*. Oxford: Clarendon.

- Hofweber, Thomas and Lange, Marc (2017). "Fine's Fragmentalist Interpretation of Special Relativity." *Noûs* 51 (4): pp. 871-883. `https://doi.org/10.1111/nous.12150`.

- Read, James (2022). "Geometric Objects and Perspectivalism." In *The Philosophy and Physics of Noether's Theorems*, edited by James Read and Nicholas J. Teh. Cambridge: CUP. `https://doi.org/10.1017/9781108665445.011`.

Presentism

Is presentism compatible with special relativity?

Core

- Putnam, Hilary (1967). "Time and Physical Geometry." *The Journal of Philosophy* 64 (8): pp. 240-247. https://doi.org/10.2307/2024493.

- Saunders, Simon (2002). "How Relativity Contradicts Presentism." In *Time, Reality and Experience*, edited by Craig Callender. Cambridge: CUP. https://doi.org/10.1017/CBO9780511550263.014.

- Hinchliff, Mark (2000). "A Defense of Presentism in a Relativistic Setting." *Philosophy of Science* 67 (3): pp. S575–S586. https://doi.org/10.1086/392847.

- Thyssen, Pieter (2019). "Conventionality and Reality." *Foundations of Physics* 49 (12): pp. 1336-1354. https://doi.org/10.1007/s10701-019-00294-8.

- Read, James and Qureshi-Hurst, Emily (2021). "Getting Tense About Relativity." *Synthese* 198 (9): pp. 8103-8125. https://doi.org/10.1007/s11229-020-02560-z.

Additional

- Savitt, Steven F. (2000). "There's No Time like the Present (In Minkowski Spacetime)." *Philosophy of Science* 67 (3): pp. S563-S574. https://doi.org/10.1086/392846.

- Stein, Howard (1991). "On Relativity Theory and Openness of the Future." *Philosophy of Science* 58 (2): pp. 147-167. https://doi.org/10.1086/289609.

- Pooley, Oliver (2013). "Relativity, the Open Future, and the Passage of Time." *Proceedings of the Aristotelian Society* 113 (3): pp. 321-363. https://doi.org/10.1111/j.1467-9264.2013.00357.x.

- Clifton, Rob and Hogarth, Mark (1995). "The Definability of Objective Becoming in Minkowski Spacetime." *Synthese* 103 (3): pp. 355-387. https://doi.org/10.1007/BF01089733.

- Savitt, Steven F. (2015). "I ♥ ♦s." *Studies in History and Philosophy of Modern Physics* 50: pp. 19-24. https://doi.org/10.1016/j.shpsb.2015.02.001.

Gravitation and the equivalence principle(s)

Critically assess the role of Einstein's elevator thought experiment in the development of general relativity.
OR:
Disambiguate different versions of the equivalence principle. In what sense is spacetime curvature necessary for the (full) explanation of gravitational redshift effects?

Core

- Lehmkuhl, Dennis (2022). "The Equivalence Principle(s)." In *The Routledge Companion to Philosophy of Physics*, edited by Eleanor Knox and Alistair Wilson. London: Routledge. `https://doi.org/10.4324/9781315623818-14`.
- Brown, Harvey R. and Read, James (2016). "Clarifying Possible Misconceptions in the Foundations of General Relativity." *American Journal of Physics* 84 (5): pp. 327-334. `https://doi.org/10.1119/1.4943264`.
- Lehmkuhl, Dennis (2014). "Why Einstein Did Not Believe That General Relativity Geometrizes Gravity." *Studies in History and Philosophy of Modern Physics* 46: pp. 316-326. `https://doi.org/10.1016/j.shpsb.2013.08.002`.
- Fankhauser, Johannes and Read, James (2024). *Gravitational Redshift Revisited: Inertia, Geometry, and Charge*. `https://philsci-archive.pitt.edu/id/eprint/23617`.
- Knox, Eleanor (2013). "Effective Spacetime Geometry." *Studies in History and Philosophy of Modern Physics* 44 (3): pp. 346-356. `https://doi.org/10.1016/j.shpsb.2013.04.002`.

Further

- Knox, Eleanor (2014). "Newtonian Spacetime Structure in Light of the Equivalence Principle." The *British Journal for the Philosophy of Science* 65 (4): pp. 863-880. `https://doi.org/10.1093/bjps/axt037`

  Prerequisites: a little differential geometry (as one might encounter in, e.g. a first physics course on GR)
- Read, James and Teh, Nicholas J. (2023). "Newtonian Equivalence Principles." *Erkenntnis* 88 (8): pp. 3479-3503. `https://doi.org/10.1007/s10670-021-00513-7`.
- Saunders, Simon (2013). "Rethinking Newton's Principia." *Philosophy of Science* 80 (1): pp. 22-48. `https://doi.org/10.1086/668881`.

- Weatherall, James Owen (2016). “Maxwell-Huygens, Newton-Cartan, and Saunders-Knox Space-Times.” *Philosophy of Science* 83 (1): pp. 82-92. `https://doi.org/10.1086/684080`.

  Prerequisites: a little differential geometry (as one might encounter in, e.g. a first physics course on GR) and familiarity with abstract index and angle brackets notation

- Read, James and Møller-Nielsen, Thomas (2020). “Motivating Dualities.” *Synthese* 197 (1): pp. 263-291. `https://doi.org/10.1007/s11229-018-1817-5`. §§2-3

  Prerequisites: a little differential geometry (as one might encounter in, e.g. a first physics course on GR) and familiarity with abstract index and angle brackets notation

The measurement problem

What is the measurement problem in quantum mechanics? What conditions should a satisfactory solution meet?

Core

- Bell, John S. (2004). "Against Measurement." In *Speakable and Unspeakable in Quantum Mechanics* (2nd edition). Cambridge: CUP.
- Redhead, Michael (1987). *Incompleteness, Nonlocality and Realism.* Oxford: Clarendon. chs. 1-2
- Albert, David (1992). *Quantum Mechanics and Experience.* Cambridge, MA: Harvard University Press. `https://doi.org/10.4159/9780674020146`. chs. 2 & 4
- Saunders, Simon (1994). "What is the Problem of Measurement?" *The Harvard Review of Philosophy* 4 (1): pp. 4-22. `https://doi.org/10.5840/harvardreview1994411`.
- Wallace, David (2019). What is Orthodox Quantum Mechanics? In *Philosophers Look at Quantum Mechanics*, edited by Alberto Coldero. Cham: Springer. `https://doi.org/10.1007/978-3-030-15659-6_17`.

EPR and Bell's theorem

Do the non-local correlations predicted by quantum mechanics tell us that the theory is incomplete?

Core

- Redhead, Michael (1987). *Incompleteness, Nonlocality and Realism.* Oxford: Clarendon. chs. 3-4
- Bell, John S. (2004). "Bertlmann's Socks and the Nature of Reality." In *Speakable and Unspeakable in Quantum Mechanics* (2nd edition). Cambridge: CUP.
- Albert, David (1992). *Quantum Mechanics and Experience.* Cambridge, MA: Harvard University Press. `https://doi.org/10.4159/9780674020146`. ch. 3
- Maudlin, Tim (2014). "What Bell Did." *Journal of Physics, A: Mathematical and Theoretical* 47: 424010. `https://doi.org/10.1088/1751-8113/47/42/424010`.
- Wallace, David (2012). *The Emergent Multiverse.* Oxford: OUP. ch. 8

Additional

- Brown, Harvey R. and Timpson, Chris G. (2016). "Bell on Bell's Theorem: The Changing Face of Nonlocality." In *Quantum Nonlocality and Reality*, edited by Mary Bell and Shan Gao. Cambridge: CUP. `https://doi.org/10.1017/CBO9781316219393.008`.
- Norsen, Travis (2009). "Local Causality and Completeness: Bell vs. Jarrett." *Foundations of Physics* 39 (3): pp. 273-294. `https://doi.org/10.1007/s10701-009-9281-1`.
- Bell, John S. (2004). "La Nouvelle Cuisine." In *Speakable and Unspeakable in Quantum Mechanics* (2nd edition). Cambridge: CUP.
- Einstein, Albert et al. (1983). "Can Quantum-Mechanical Description of Reality Be Considered Complete?" In *Quantum Theory and Measurement*, edited by John A. Wheeler and Wojciech H. Zurek. Princeton, NJ: Princeton University Press.
- Myrvold, Wayne C. (2016). "Lessons of Bell's Theorem: Nonlocality, Yes; Action at a Distance, Not Necessarily." In *Quantum Nonlocality and Reality*, edited by Mary Bell and Shan Gao. Cambridge: CUP. `https://doi.org/10.1017/CBO9781316219393.016`.

De Broglie-Bohm theory

Does de Broglie-Bohm theory solve the measurement problem? Does it provide a *distinctive* solution to the measurement problem?

Core

- Albert, David (1992). *Quantum Mechanics and Experience.* Cambridge, MA: Harvard University Press. https://doi.org/10.4159/9780674020146. ch. 7

- Maudlin, Tim (2019). *Philosophy of Physics: Quantum Theory.* Princeton, NJ: Princeton University Press. https://doi.org/10.1515/9780691190679. ch. 5

- Tumulka, Roderich (2022). "Bohmian Mechanics." In *The Routledge Companion to Philosophy of Physics*, edited by Eleanor Knox and Alistair Wilson. Oxford: Routledge. https://doi.org/10.4324/9781315623818-23.

- Brown, Harvey R. et al. (1995). "Bohm Particles and Their Detection in the Light of Neutron Interferometry." *Foundations of Physics* 25 (2): pp. 329-347. https://doi.org/10.1007/BF02055211.

- Brown, Harvey R. and Wallace, David (2005). "Solving the Measurement Problem: De Broglie-Bohm Loses Out to Everett." *Foundations of Physics* 35 (4): pp. 517-540. https://doi.org/10.1007/s10701-004-2009-3.

Additional

- Goldstein, Sheldon. "Bohmian Mechanics." In *The Stanford Encyclopedia of Philosophy* (Summer 2024 Edition), edited by Edward N. Zalta and Uri Nodelman https://plato.stanford.edu/archives/sum2024/entries/qm-bohm/.

- Dürr, Detlef et al. (1996). "Bohmian Mechanics as the Foundation of Quantum Mechanics." In *Bohmian Mechanics and Quantum Theory: An Appraisal*, edited by James T. Cushing et al. Dordrecht: Springer. https://doi.org/10.1007/978-94-015-8715-0_2.

- Valentini, Anthony (2001). "Hidden Variables, Statistical Mechanics and the Early Universe." In *Chance in Physics: Foundations and Perspectives*, edited by Jean Bricmontet et al. Berline: Springer. https://doi.org/10.1007/3-540-44966-3_12.

- Valentini, Anthony (2010). "De Broglie-Bohm Pilot-Wave Theory: Many Worlds in Denial?" In *Many Worlds? Oxford University Press*, edited by Simon Saunders et al. https://doi.org/10.1093/acprof:oso/9780199560561.003.0019.

- Brown, Harvey R. (2010). “Reply to Valentini” In *Many Worlds? Oxford University Press*, edited by Simon Saunders et al. `https://doi.org/10.1093/acprof:oso/9780199560561.003.0020`.

Further

- Gao, Shan (2023). “Can the Ontology of Bohmian Mechanics Consists Only in Particles? The PBR Theorem Says No.” *Foundations of Physics* 53 (6). `https://doi.org/10.1007/s10701-023-00731-9`.
- Myrvold, Wayne C. (2022). “Relativistic Constraints on Interpretations of Quantum Mechanics.” In *The Routledge Companion to Philosophy of Physics*, edited by Eleanor Knox and Alistair Wilson. Oxford: Routledge. `https://doi.org/10.4324/9781315623818-12`. §8.5.1
- Dürr, Detlef et al. (2014). “Can Bohmian Mechanics Be Made Relativistic?” *Proceedings of the Royal Society A: Mathematical, Physical, and Engineering Sciences* 470 (2162): 20130699. `https://doi.org/10.1098/rspa.2013.0699`.
- Dewar, Neil (2020). “La Bohume.” *Synthese* 197 (10): pp. 4207-4225. `https://doi.org/10.1007/s11229-018-1800-1`.
- Ruetsche, Laura (2023). “UnBorn: Probability in Bohmian Mechanics.” *Philosophy of Physics* 1 (1): 1. `https://doi.org/10.31389/pop.24`.

Collapse theories

Explain the 'problem(s) of tails' in dynamical collapse theories. How serious is it?

Core

- Albert, David (1992). *Quantum Mechanics and Experience*. Cambridge, MA: Harvard University Press. `https://doi.org/10.4159/9780674020146`. ch. 5
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The Everett interpretation: probability

What is the 'problem of probability' in the Everett interpretation? Does it have a satisfactory solution?

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The Everett interpretation: ontology

Can the world be only wavefunction?

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