# Schedule of Lectures for "Kant and the Philosophy of Science"

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course website:
http://strangebeautiful.com/lmu/2014-winter-kant-phil-sci.html

Winter, 2014–2015
Wednesdays, 14:00–16:00 C.T.
Ludwigstr. 31, 021

## Contents

*N.b.*: many of the required and suggested readings are available online at the course's website, though they may not be listed as such in the bibliography:

http://strangebeautiful.com/lmu/2014-winter-kant-phil-sci.html

# 1 Weeks 1–2: Introduction, Historical Background, Newton (Oct. 08–15)

## 1.1 Week 1: Introduction (Oct. 08)

Introduction, historical background

### Suggested Reading

1. Friedman (1992), *Kant and the Exact Sciences*: Introduction, pp. 1–54
2. Massimi (2009), "Philosophy and the Sciences after Kant"

## 1.2 Week 2: Newton (Oct. 15)

Newton's achievements as background and foundation for Kant's mature thought

### Required Reading

1. Newton (1999), *Philosophiæ Naturalis Principia Mathematica*: Author's Preface (pp. 381–383); Definitions and Scholium (pp. 403–415); Axioms, or the Laws of Motion and Scholium (pp. 416–430); Rules for the Study of Natural Philosophy (pp. 794–796); General Scholium (pp. 939–944)
2. Stein (1990b), "On Locke, 'the Great Huygenius, and the Incomparable Mr. Newton'"

### Suggested Reading

1. Cohen (1985), *The Birth of a New Physics*: ch. 7

2. Disalle (2004), "Newton's Philosophical Analysis of Space and Time"
3. DiSalle (2006b), *Understanding Space-Time: The Philosophical Development of Physics from Newton to Einstein*: chs. 1–2
4. Harper (2004), "Newton's Argument for Universal Gravitation"
5. Harper (2011), *Isaac Newton's Scientific Method: Turning Data Into Evidence about Gravity and Cosmology*': *passim*
6. Massimi (2013), "Philosophy of Natural Science from Newton to Kant"
7. Maxwell (1877), *Matter and Motion*
8. Newton (nown), "De Gravitatione et Æquipondio Fluidorum"
9. Stein (npubc), "On Metaphysics and Method in Newton"
10. Stein (npuba), "Further Considerations on Newton's Method"
11. Stein (npubb), "Newton: Philosophy of Inquiry and Metaphysics of Nature"
12. Stein (1967), "Newtonian Space-Time"
13. Stein (1977), "Some Philosophical Prehistory of General Relativity": §§1–4, pp. 3–14
14. Stein (1990a), "'From the Phænomena of Motions to the Forces of Nature': Hypothesis or Deduction?"
15. Stein (2004b), "Newton's Metaphysics"

# 2 Weeks 3–5: Kant (Oct. 22–Nov. 05)

## 2.1 Week 3: Kant, *Critique of Pure Reason*, Part 1 (Oct. 22)

*Critique of Pure Reason*: the analytic and synthetic, the *a priori* and *a posteriori*, the pure forms of perception

### Required Reading

1. Kant (1929) or Kant (1998), *Critique of Pure Reason*: Preface to First Edition (pp. 7–16); Preface to Second Edition (pp. 17–38); Introduction, §§I–VII (pp. 41–64); Transcendental Aesthetic (pp. 65–91)

### ***Strongly* Suggested Reading**

1. Hume (1978), *A Treatise of Human Nature*: Book I, Part I, §§I–VII; Book I, Part III, §§I–XIV; Book I, Part IV, §§I–IV

### Suggested Reading

1. Allison (2004), *Kant's Transcendental Idealism: An Interpretation and Defense*: *passim*

2. Allison (2006), "A Priori"
3. Disalle (2013), "The Transcendental Method from Newton to Kant"
4. Friedman (1985), "Kant's Theory of Geometry"
5. Friedman (1992), *Kant and the Exact Sciences*: ch. 1 (pp. 55–95)
6. Friedman (2014), "Space in Kantian Idealism"
7. Guyer (1987), *Kant and the Claims of Knowledge*: *passim*
8. Guyer (2010), *The Cambridge Companion to Kant's Critique of Pure Reason*: *passim*
9. Harper (1986), "Kant on the A Priori and Material Necessity"
10. Kemp-Smith (1923), *Commentary to Kant's* Critique of Pure Reason: *passim*
11. Pierris (1992), "The Constitutive A Priori"
12. Strawson (1966), *The Bounds of Sense: An Essay on Kant's* Critique of Pure Reason: *passim*

### 2.2 Week 4: Kant, *Critique of Pure Reason*, Part 2 (Oct. 29)

*Critique of Pure Reason*: the pure categories of the understanding, judgments of experience

#### Required Reading

1. Kant (1929) or Kant (1998), *Critique of Pure Reason*: Analytic of Concepts, ch. 1, §§1–3 (pp. 104–119); Analytic of Principles, Introduction, ch. 1, ch.2 §§1–3 and first part of §4 (pp. 176–243)

#### ***Strongly* Suggested Reading**

1. Hume (1978), *A Treatise of Human Nature*: Book I, Part I, §§I–VII; Book I, Part III, §§I–XIV; Book I, Part IV, §§I–IV

#### Suggested Reading

1. Allison (2004), *Kant's Transcendental Idealism: An Interpretation and Defense*: *passim*
2. Disalle (2013), "The Transcendental Method from Newton to Kant"
3. Friedman (2014), "Space in Kantian Idealism"
4. Guyer (1987), *Kant and the Claims of Knowledge*: *passim*
5. Guyer (2010), *The Cambridge Companion to Kant's Critique of Pure Reason*: *passim*
6. Harper (1986), "Kant on the A Priori and Material Necessity"
7. Kemp-Smith (1923), *Commentary to Kant's* Critique of Pure Reason: *passim*
8. Strawson (1966), *The Bounds of Sense: An Essay on Kant's* Critique of Pure Reason: *passim*

### 2.3 Week 5: Kant, *Prolegemona* (Nov. 05)

How is natural science of the sort Newton achieved possible, and what is its conceptual structure?

#### Required Reading

1. Kant (2004b), *Prolegemona to Any Future Metaphysics That Will Be Able to Come Forward as Science*

#### Suggested Reading

1. Allison (2004), *Kant's Transcendental Idealism: An Interpretation and Defense*: *passim*
2. DiSalle (2006b), *Understanding Space-Time: The Philosophical Development of Physics from Newton to Einstein*: ch. 3, §§1–4
3. Domski (2013), "Kant and Newton on the A Priori Necessity of Geometry"
4. Friedman (1985), "Kant's Theory of Geometry"
5. Friedman (1992), *Kant and the Exact Sciences*: chs. 2–4 (pp. 96–212)
6. Friedman (2012a), "The 'Prolegomena' and Natural Science"
7. Friedman (2002), "Kant, Kuhn and the Rationality of Science"
8. Friedman (2006), "Philosophy of Natural Science"
9. Friedman (2013), *Kant's Construction of Nature: A Reading of the* Metaphysical Foundations of Natural Science: *passim*
10. Guyer (1987), *Kant and the Claims of Knowledge*: *passim*
11. Guyer (2010), *The Cambridge Companion to Kant's Critique of Pure Reason*: *passim*
12. Harper (1986), "Kant on the A Priori and Material Necessity"
13. Harper (1992), "Kant on Space, Empirical Realism and the Foundations of Geometry"
14. Harper (1995), "Kant, Riemann and Reichenbach on Space and Geometry"
15. Kant (2004a), *Metaphysical Foundations of Natural Science*: *passim*
16. Massimi (2014), "Prescribing Laws to Nature"
17. Strawson (1966), *The Bounds of Sense: An Essay on Kant's* Critique of Pure Reason: *passim*

# 3 Weeks 6–7: Kant's Influence in the 19th Century (Nov. 12–19)

## 3.1 Week 6: Riemann and Helmholtz (Nov. 12)

Mathematical and physical geometry after Kant

### Required Reading

1. Helmholtz (1870), "Über den Ursprung und die Bedeutung der geometrischen Axiome" ("On the Origin and Significance of the Geometrical Axioms")
2. Riemann (1854), "Über die Hypothesen, welche der Geometrie zu Grunde liegen" ("On the Hypotheses, Which Lie at the Basis of Geometry")

### Suggested Reading

1. DiSalle (2006b), *Understanding Space-Time: The Philosophical Development of Physics from Newton to Einstein*: ch. 3, §§5–6
2. DiSalle (2006a), "Kant, Helmholtz, and the Meaning of Empiricism"
3. Harper (1995), "Kant, Riemann and Reichenbach on Space and Geometry"
4. Helmholtz (1868), "Über die Tatsachen, welche der Geometrie zu Grunde liegen" ("On the Facts, Which Lie at the Basis of Geometry")
5. Hyder (2009), *The Determinate World: Kant and Helmholtz on the Physical Meaning of Geometry*: *passim*
6. Sklar (1976), *Space, Time and Spacetime*
7. Torretti (1978), *Philosophy of Geometry from Riemann to Poincaré*: ch. 2, §§1–2; ch. 3, §1
8. Weyl (1949), *Philosophy of Mathematics and Natural Science*: ch. III (pp. 67–91)

## 3.2 Week 7: Hertz and Poincaré (Nov. 19)

Neo-Kantian mechanics; geometrical conventionalism

### Required Reading

1. Hertz (1899), *The Principles of Mechanics Presented in a New Form*: Introduction (pp. 1–41)
2. Poincaré (1905), *Science and Hypothesis*: Part II, chs. III–V (pp. 42–100)

### Suggested Reading

1. Coffa (1986), "From Geometry to Tolerance: Sources of Conventionalism in 19th Century Geometry"
2. DiSalle (2006b), *Understanding Space-Time: The Philosophical Development of Physics from Newton to Einstein*: ch. 3, §§7–8
3. Helmholtz (1899), Preface (pp. I–XX) to *The Principles of Mechanics Presented in a New Form* by H. Hertz
4. Lützen (2006), "Images and Conventions: Kantianism, Empiricism, and Conventionalism in Hertz's and Poincaré's Philosophies of Space and Mechanics"
5. Mach (1960), *Space and Geometry*
6. Mach (1988), *The Science of Mechanics: A Critical and Historical Account of Its Development*
7. Schlick (1953), "Are Natural Laws Conventions?"
8. Sklar (1976), *Space, Time and Spacetime*
9. Stein (npubd), "Physics and Philosophy Meet: the Strange Case of Poincaré"
10. Torretti (1978), *Philosophy of Geometry from Riemann to Poincaré*: ch. 4, §4
11. Weyl (1949), *Philosophy of Mathematics and Natural Science*: ch. III (pp. 67–91)

# 4 Week 8: NO SEMINAR (Nov. 26)

# 5 Weeks 9–11: Kant's Influence in the Early 20th Century (Dec. 03–Dec. 17)

## 5.1 Week 9: Russell (Dec. 03)

Russell's structural view of physical knowledge

### Required Reading

1. Russell (1927), *The Analysis of Matter*: ch. I (pp. 1–10); Part I, ch. XIV (pp. 130–140); Part II, chs. XV–XXIV (pp. 141–256)

### Suggested Reading

1. Demopoulos (2008), "Some Remarks on the Bearing of Model Theory on the Theory of Theories"
2. Demopoulos and Friedman (1985), "Bertrand Russell's *The Analysis of Matter*: Its Historical Context and Contemporary Interest"
3. Demopoulos and Friedman (1989), "The Concept of Structure in Russell's *The Analysis of Matter*"

4. Newman (1928), "Mr. Russell's Causal Theory of Perception"
5. Ramsey (1931a), "Facts and Propositions"
6. Ramsey (1931c), "Theories"

### 5.2 Week 10: Reichenbach (Dec. 10)

The constitutive and the relative *a priori* in scientific knowledge

#### Required Reading

1. Reichenbach (1965), *The Theory of Relativity and A Priori Knowledge*: ch. I (pp. 1–5); chs. IV–VII (pp. 34–92)

#### Suggested Reading

1. Cassirer (1980b), *Substance and Function*
2. Cassirer (1980a), *Einstein's Theory of Relativity*
3. Coffa (2008), *The Semantic Tradition from Kant to Carnap: To the Vienna Station*: *passim*
4. Friedman (2007), "Coordination, Constitution, and Convention: The Evolution of the A Priori in Logical Empiricism"
5. Harper (1995), "Kant, Riemann and Reichenbach on Space and Geometry"
6. Padovani (2011), "Relativizing the Relativized A Priori: Reichenbach's Axioms of Coordination Divided"
7. Reichenbach (1936), "Logistic Empiricism in Germany and the Present State of its Problems"
8. Reichenbach (1958), *The Philosophy of Space & Time*: ch. 1
9. Schlick (1985), *The General Theory of Knowledge*: Part I, §§1–12, pp. 1–93; Part III, ch. A, §§22–26, pp. 171–232; Part III, ch. C, §§36–41, pp. 333–400;

### 5.3 Week 11: Carnap (Dec. 17)

Observational versus theoretical concepts and terms; the analytic, the synthetic and the *a priori* in linguistic frameworks

#### Required Reading

1. Carnap (1936), "Testability and Meaning"
2. Carnap (1956a), "Empiricism, Semantics and Ontology"
3. Stein (1992), "Was Carnap Entirely Wrong, After All?"

#### Suggested Reading

1. Carnap (1956b), "The Methodological Character of Theoretical Concepts"
2. Carnap (1959), *The Logical Syntax of Language*
3. Coffa (2008), *Semantic Tradition Kant to Carnap: To the Vienna Station*: *passim*
4. Demopoulos (2013c), "On Extending 'Empiricism, Semantics and Ontology' to the Realism-Instrumentalism Controversy"
5. Demopoulos (2013d), "On the Rational Reconstruction of Our Theoretical Knowledge"
6. Demopoulos (2013e), "Three Views of Theoretical Knowledge"
7. Friedman (2002), "Kant, Kuhn and the Rationality of Science"
8. Friedman (2007), "Coordination, Constitution, and Convention: The Evolution of the A Priori in Logical Empiricism"
9. Friedman (2011a), "Carnap on Theoretical Terms: Structuralism without Metaphysics"
10. Lutz (2014), "Carnap on Empirical Significance"
11. Putnam (1983d), "'Two Dogmas' Revisited"
12. Quine (1980b), "Two Dogmas of Empiricism"
13. Quine (1951), "On Carnap's Views on Ontology"
14. Quine (1960), "Carnap and Logical Truth"
15. Reichenbach (1936), "Logistic Empiricism in Germany and the Present State of its Problems"

# 6 Week 12: NO SEMINAR (Dec. 24)

# 7 Weeks 13–16: Contemporary Neo-Kantianism (Jan. 07–28)

## 7.1 Week 13: Michael Friedman (Jan. 07)

The relativized *a priori* and the structure and nature of scientific knowledge

### Required Reading

1. Friedman (2001), *The Dynamics of Reason*

### Suggested Reading

1. DiSalle (2002), "Reconsidering Kant, Friedman, Logical Positivism, and the Exact Sciences"

2. Domski and Dickson (2010), *Discourse on a New Method: Reinvigorating the Marriage of History and Philosophy of Science*
3. Fraassen (2008), *Scientific Representation*: ch. 5, pp. 115–140
4. Friedman (2008), "Einstein, Kant, and the A Priori"
5. Friedman (2009), "Einstein, Kant, and the Relativized A Priori"
6. Friedman (2010), "A Post-Kuhnian Approach to the History and Philosophy of Science"
7. Friedman (2011b), "Extending the Dynamics of Reason"
8. Friedman (2012b), "Reconsidering the Dynamics of Reason: Response to Ferrari, Mormann, Nordmann, and Uebel"
9. Kuhn (1996), *The Structure of Scientific Revolutions*
10. Kuhn (1993), "Afterwords"
11. Lange (2004), "Review Essay on *Dynamics of Reason* by Michael Friedman"
12. Quine (1980a), *From a Logical Point of View*
13. Quine (1969), *Ontological Relativity and Other Essays*
14. Uebel (2012), "De-Synthesizing the Relative A Priori"

### 7.2 Week 14: Data and Phenomena (Jan. 14)

How does experimental data get turned into structured phenomena of the sort amenable to making contact with scientific theories?

#### Required Reading

1. Bogen and Woodward (1988), "Saving the Phenomena"
2. Massimi (2011), "From Data to Phenomena: A Kantian Stance"
3. Stein (1994), "Some Reflections on the Structure of Our Knowledge in Physics"
4. Stein (1992, pp. 298-291), "Was Carnap Entirely Wrong, after All?": pp. 298–291 (from "Now, I have remarked that" on p. 289, to "in terms of the pragmatics of a Carnapian framework." on p. 291)

#### Suggested Reading

1. Fraassen (1980), *The Scientific Image*, chs. 3–4
2. Fraassen (2008), *Scientific Representation*: chs. 6–7, pp. 141–190
3. Lakatos (1970), "Falsification and the Methodology of Scientific Research Programmes"
4. Massimi (2008b), "Why There Are No Ready-Made Phenomena: What Philosophers of Science Should Learn from Kant"
5. McAllister (2011), "What Do Patterns in Empirical Data Tell Us about the Structure of the World?"

6. Stein (2004a), "The Enterprise of Understanding and the Enterprise of Knowledge"
7. Teller (2010), "'Saving the Phenomena' Today"
8. Woodward (1989), "Data and Phenomena"
9. Woodward (2000), "Data, Phenomena, and Reliability"
10. Woodward (2010), "Data, Phenomena, Signal, and Noise"
11. Woodward (2011), "Data and Phenomena: A Restatement and Defense"

### 7.3 Week 15: The Structure of Scientific Theories (Jan. 21)

What structure must scientific theories have in order to represent phenomena and encode scientific knowledge?

#### Required Reading

1. Putnam (1962), "What Theories Are Not"
2. Fraassen (1980), *The Scientific Image*, ch. 3

#### Suggested Reading

1. Brading and Landry (2004), "A Minimal Construal of Scientific Structuralism"
2. Brading and Landry (2006), "Scientific Structuralism: Presentation and Representation"
3. Fraassen (2008), *Scientific Representation*: ch. 11, pp. 237–268
4. Halvorson (2012), "What Scientific Theories Could Not Be"
5. Lakatos (1970), "Falsification and the Methodology of Scientific Research Programmes"
6. Putnam (1983a), "Models and Reality"
7. Suppe (1974), "The Search for Philosophic Understanding of Scientific Theories"
8. Suppes (1960), "A Comparison of the Meaning and Uses of Models in Mathematics and the Empirical Sciences"

### 7.4 Week 16: Realism and Empiricism (Jan. 28)

The status of the noumena today.

#### Required Reading

1. Boyd (1991), "On the Current State of Scientific Realism"
2. Fraassen (1980), *The Scientific Image*, ch. 2

3. Stein (1989), "Yes, but...: Some Skeptical Remarks on Realism and Anti-Realism"

### Suggested Reading

1. Chang (2008), "Contingent Transcendental Arguments for Metaphysical Principles"
2. Demopoulos (2013c), "On Extending 'Empiricism, Semantics and Ontology' to the Realism-Instrumentalism Controversy"
3. Demopoulos (2013a), "Carnap's Analysis of Realism"
4. Fraasen (1976), "To Save the Phenomena"
5. Fraassen (2008), *Scientific Representation*: chs. 12–13, pp. 269–308
6. Morrison (2008), "Reduction, Unity, and the Nature of Science: Kant's Legacy?"
7. Putnam (1981), *Reason, Truth and History*
8. Putnam (1983a), "Models and Reality"
9. Putnam (1983c), "Reference and Truth"
10. Putnam (1983e), "Why There Isn't a Ready-Made World"
11. Torretti (2008), "Objectivity: A Kantian Perspective"

## 8 FINAL PAPER DUE (Mar. 27)

## References

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Allison, H. (2006). "a priori". See Guyer (2006), Chapter 1, pp. 28–60.

Bogen, J. and J. Woodward (1988, July). Saving the phenomena. *The Philosophical Review* XCVII(3), 303–352. doi:10.2307/2185445.

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Brading, K. and E. Landry (2006, December). Scientific structuralism: Presentation and representation. *Philosophy of Science 73*, 571–581. Originally delivered as a talk as part of the Symposium "The Semantic View of Theories, Scientific Structuralism and Structural Realism", at the 20th biennial meeting of the Philosophy of Science Association, 2004, Vancouver, BC. Extended version available at http://philsci-archive.pitt.edu/archive/00002181/01/Minimal_Structuralism.pdf.

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Carnap, R. (1959). *The Logical Syntax of Language*. International Library of Psychology, Philosophy and Scientific Method. Paterson, NJ: Littlefield, Adams & Co. Originally published as *Logische Syntax der Sprache*, Springer, Wien, 1934. Translated by A. Smeaton. Reprint of the first English edition, Routledge and Kegan Paul, Ltd., London, 1937.

Cassirer, E. (1980a). *Einstein's Theory of Relativity*. New York: Dover Publications, Inc.

Cassirer, E. (1980b). *Substance and Function*. New York: Dover Publications, Inc.

Chang, H. (2008). Contingent transcendental arguments for metaphysical principles. See Massimi (2008a), Chapter 6, pp. 113–134.

Coffa, J. (1986). From geometry to tolerance: Sources of conventionalism in 19th century geometry. In R. Colodny (Ed.), *From Quarks to Quasars: Philosophical Problems of Modern Physics*, pp. 3–70. Pittsburgh: Pittsburgh University Press.

Coffa, J. (2008). *The Semantic Tradition from Kant to Carnap: To the Vienna Station*. Cambridge: Cambridge University Press.

Cohen, I. (1985). *The Birth of a New Physics* (Revised and updated ed.). New York: W. W. Norton & Co.

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Demopoulos, W. (2008). Some remarks on the bearing of model theory on the theory of theories. *Synthese 164*(3), 359–383.

Demopoulos, W. (2013a). Carnap's analysis of realism. See Demopoulos (2013b), Chapter 4, pp. 68–89.

Demopoulos, W. (2013b). *Logicism and Its Philosophical Legacy*. Cambridge: Cambridge University Press.

Demopoulos, W. (2013c). On extending "Empiricism, semantics and ontology" to the realism-instrumentalism controversy. See Demopoulos (2013b), Chapter 3, pp. 46–67.

Demopoulos, W. (2013d). On the rational reconstruction of our theoretical knowledge. See Demopoulos (2013b), Chapter 6, pp. 108–139.

Demopoulos, W. (2013e). Three views of theoretical knowledge. See Demopoulos (2013b), Chapter 7, pp. 140–168.

Demopoulos, W. and M. Friedman (1985). Bertrand Russell's *The Analysis of Matter*: Its historical context and contemporary interest. *Philosophy of Science 52*(4), 621–639.

Demopoulos, W. and M. Friedman (1989). The concept of structure in Russell's *The Analysis of Matter*. In C. Savage and C. Anderson (Eds.), *Rereading Russell: Essays in Bertrand Russell's Metaphysics and Epistemology*, pp. 183–199. Minneapolis: University of Minnesota Press.

DiSalle, R. (2002, June). Reconsidering Kant, Friedman, Logical Positivism, and the exact sciences. *Philosophy of Science 69*(2), 191–211. doi:10.1086/341049.

Disalle, R. (2004). Newton's philosophical analysis of space and time. See Cohen and Smith (2004), Chapter 1, pp. 33–56.

DiSalle, R. (2006a). Kant, Helmholtz, and the meaning of empiricism. See Friedman and Nordmann (2006), Chapter 7, pp. 123–140.

DiSalle, R. (2006b). *Understanding Space-Time: The Philosophical Development of Physics from Newton to Einstein*. Cambridge: Cambridge University Press.

Disalle, R. (2013, September). The transcendental method from Newton to Kant. *Studies in History and Philosophy of Science Part A 44*(3), 448–456.

doi:10.1016/j.shpsa.2012.10.006.

Domski, M. (2013, September). Kant and Newton on the a priori necessity of geometry. *Studies in History and Philosophy of Science Part A 44*(3), 438–447. doi:10.1016/j.shpsa.2012.10.007.

Domski, M. and M. Dickson (Eds.) (2010). *Discourse on a New Method: Reinvigorating the Marriage of History and Philosophy of Science*. LaSalle, IL: Open Court Press.

Fraasen, B. v. (1976). To save the phenomena. *Journal of Philosophy 73*(18), 623–632. doi:10.2307/2025818.

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Friedman, M. (2007). Coordination, constitution, and convention: The evolution of the a priori in Logical Empiricism. In A. Richardson and T. Uebel (Eds.), *The Cambridge Companion to Logical Empiricism*, pp. 91–116. Cambridge: Cambridge University Press.

Friedman, M. (2008). Einstein, Kant, and the a priori. See Massimi (2008a), Chapter 5, pp. 95–112.

Friedman, M. (2009). Einstein, Kant, and the relativized a priori. In M. Bitbol, P. Kerszberg, and J. Petitot (Eds.), *Constituting Objectivity: Transcendental Perspectives on Modern Physics*, Volume 74 of *The Western Ontario Series in Philosophy of Science*, Chapter 15, pp. 253–267. Berlin: Springer. doi:10.1007/978-1-4020-9510-8_15.

Friedman, M. (2010, October). A post-Kuhnian approach to the history and philosophy of science. *The Monist 93*(4), 497–517. doi:10.5840/monist201093430.

Friedman, M. (2011a, May). Carnap on theoretical terms: Structuralism without metaphysics. *Synthese 180*, 249–263. doi:10.1007/s11229-009-9604-y.

Friedman, M. (2011b, November). Extending the dynamics of reason. *Erkenntnis 75*(3), 431–444. doi:10.1007/s10670-011-9342-7.

Friedman, M. (2012a). The 'Prolegomena' and natural science. In H. Lyre and O. Schliemann (Eds.), *Kants Prolegomena : ein kooperativer Kommentar*, pp. 299–326. Frankfurt am Main: Klostermann.

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Friedman, M. (2013). *Kant's Construction of Nature: A Reading of the* Metaphysical Foundations of Natural Science. Cambridge: Cambridge University Press.

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