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Plenary Agenda Report for Research Group D-II-2

Place, Space, and Motion

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- Benjamin Morison (Philosophy, Princeton University), September – December 2008
- Emidio Spinelli (Philosophy, Università di Roma, La Sapienza), November 2009 – November 2010
- Katja Vogt (Philosophy, Columbia University), April – May 2010
- Nathan Powers (Philosophy, SUNY Albany), June – July 2010
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Abstract: (a) *Topics and Goals.* The Junior Research Group »Place, Space and Motion« investigates the role of spatial concepts in physical theories in the millennium from Plato (4th century BCE) through Philoponus and Simplicius (6th century CE). In particular, we examine the explicit theoretical views of ancient physicists and philosophers concerning space, the spatial features of bodies, and the existence of isomorphisms among space, change, and time. Projects are devoted to issues in Plato's *Timaeus* and Aristotle's *Physics*, and to the interwoven reception of these texts in Middle Platonism and Late Platonism. We trace the evolving answers given to such central questions as whether space is metaphysically basic or is rather dependent upon bodies or even non-spatial entities (such as souls); the possibility of empty space; the causal role of space in nature; how spatial structures make certain kinds of change possible or necessary. The group aims to produce a series of essays and commentaries examining key texts of Plato and Aristotle and tracing the reception and transformation of their views in Middle- and Late Platonism.

(b) *Methods.* The group engages in close reading and interpretation of ancient texts, with the aim of constructing a history of engagement with the questions indicated above. The main areas of expertise brought to bear on the relevant texts lie in classical philology, history of ideas, history of science, and systematic philosophy. In a weekly research seminar, individual research projects and results are presented in detail and discussed in the light of these varied disciplines and skill sets.

(c) *State of Discussion.* Relevant texts are interpreted both internally and in the light of their relationships with earlier sources and later readings. In this way a narrative is emerging of development and interrelationship among ancient theories of space – a narrative with some shape and coherence, but without the suppression of details and uncertainties. The group is also beginning to pay more attention to epistemological issues, concerning the sources of theoretical knowledge about space, and the evolving standards of argument, justification, and presentation of such knowledge.

Projects:

- »The Receptacle in Plato's *Timaeus*« (Jonathan Beere, Georgia Mouroutsou)
- »The Receptacle in Middle Platonism« (Georgia Mouroutsou)
- »The Topology of Change« (Jacob Rosen)
- »The Priority of Locomotion« (Sebastian Odzuck; dissertation project)
- »A Method of Modal Proof in Aristotle« (Jacob Rosen, Marko Malink [D-III-E-II-1 *Dialectical Topoi*])
- »The Ancient Debate Over Void« (Jonathan Beere)
- »Plotinus on the Receptacle as Prime Matter« (Christopher Noble)
- »Philoponus on Place, Void and Motion« (Ioannis Papachristou; dissertation project)
- »Simplicius's *Corollary on Place*« (Christoph Helmig)
- »Motion, Movers, and Indivisibility: Proclus' *Elements of Physics*« (Christoph Helmig, Jan Opsomer)

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1 Results

Plato and Aristotle initiated a tradition of explicit, theoretical reflection on the notion of space or place as it figures in metaphysics and natural philosophy. Their theories were received and transformed in various ways throughout antiquity. Our group traces the history of this tradition from Plato through Aristotle up to their late ancient interpreters.

Our central question is: To which *sorts of explicit and theoretical knowledge about space did physicists and philosophers lay claim in antiquity?* This is meant to complement the many other questions about space and knowledge being investigated within *Topoi*, for example: What sorts of *implicit* or *practical* knowledge did people have about space in antiquity? How was knowledge of various kinds acquired, preserved, or transmitted through the use of spatial structures – such as buildings, monuments, or diagrams? How did knowledge of various kinds – such as technological innovations – spread across space from community to community?

Aristotle's theoretical account of the nature of place and related phenomena set the terms of almost all subsequent ancient philosophical debates over spatial concepts. His account was the product of a critical engagement with predecessors' views on the same issues, and above all with the theory of »space« (*chōra*) presented in Plato's *Timaeus*. Aristotle rejected the Timaeian account of space, but not before carrying out a highly influential project of clarification or correction (or perhaps distortion?) of the concepts employed in that account. Aristotle's efforts in this direction guided all later readings of the Platonic dialogue. For this reason, a history of the period under study requires ample attention to Aristotle's conceptual framework and his positive views.

1.1 Aristotle

Aristotle's treatise on place, *Physics* 4.1–5, provides his official positive account of place, along with his influential reading of the theory of space presented in Plato's *Timaeus*. An authoritative reconstruction of the theory endorsed in this treatise was published a few years before the beginning of *Topoi* (MORISON 2002), and we have no intention of trying to replace MORISON's account. Instead, our work on the treatise is focused on its forward- and backward-looking historical relationships; we study it in connection with the interpretation and criticisms offered by later commentators (cf. section 1.3 below), and with a view toward understanding why Aristotle believed the Timaeian theory of space should be understood as a theory on which space is *matter* (cf. section 1.2 below). We also consider how Aristotle might have responded to certain objections to his account of place raised by later commentators.

Physics 4 does not provide the whole story of Aristotle's theoretical engagement with space. The places of *Physics* 4 are two-dimensional surfaces, and to be in such a place is to be surrounded by it. On many other theories, space and places are three-dimensional, and to be in a place is to occupy it, in such a way as to be coextensive with it. For various reasons, Aristotle came to the view that no theory along the latter lines can be made to work. He recognizes, of course, that bodies are extended in three dimensions, and he examines the structure of bodily extension in detail in *Physics* 5–6. He does not speak of himself as examining the structure of space, but it is fair to describe him as at least

offering a study of *spatial extension*. (His reasons for maintaining that such extension is no more than an aspect or quasi-constituent of bodies, not something independent, may help explain why he regards Plato's *chōra* as something akin to matter.)

Aristotle's study treats the structure of bodily extension in parallel with the structures of change and of time. He argues for various isomorphisms among these three structures. For the most part, he derives features of change and time from features of spatial extension, but sometimes the direction of argument is different: in one passage, for example, he uses principles about faster and slower motion to argue simultaneously for the infinite divisibility of time and of spatial extension. Aristotle argues for a number of theses which are no longer accepted today, representative examples being

- a) no motion can reverse direction without an extended interval of rest in between (false according to infinitesimal calculus – 17th century),
- b) no magnitude or time is composed out of points or instants (false according to set theory – late 19th century).

The broad outlines of Aristotle's views – and their defects according to modern mathematics – are fairly well understood, but many of his arguments for those views have proven enigmatic even in their outlines and methods. Drawing on the group's combined competencies in mathematics, philosophy, and philology, we are developing reconstructions of Aristotle's arguments step by step and clarifying the order of interdependence among his various theses.

Certain of Aristotle's arguments about motion employ a rather subtle method of argument which involves, at a crucial step, assuming as *true* a statement which has only been asserted to be *possible*. The method of argument, as it turns out, appears in a number of difficult and controversial passages in Aristotle, and became a point of common interest between our group and our colleague Marko Malink in group D-III-E-II-1 (*Dialectical Topoi*). In collaboration with Malink, we have prepared a detailed treatment of the argumentative method in question, and shown that it is in principle valid (although in some cases Aristotle applies the method in a faulty way).

Not only does change in general share structural features with spatial extension; Aristotle also holds that the most fundamental kind of change is *locomotion*, change of place. In part this is because, he thinks, circular locomotion is the only viable candidate for an eternal and continuous change, and an eternal continuous change deserves a rank of high priority. Aristotle moreover ascribes *ontological* priority to locomotion: the existence of other kinds of change depends on the existence of locomotion, but not vice versa. A dissertation project within our group has led to greater clarity about the sense in which locomotion for Aristotle is prior to other changes, and why its priority is crucial to his systematic account of change in the cosmos.

1.2 Plato and Later Platonism

We revisit Plato's theory of *chōra* with a critical eye on Aristotle's influential assimilation of *chōra* to a sort of matter. Plato's view of space in the *Timaeus* turns out to be impossible to align in any straightforward way with contemporary ways of thinking about either space or matter. This is related to the fact that he doesn't seem to think of there being sensible »objects« which are the subjects of properties (*hypokeimena*), and yet does think that any perceptible change has to have something underlying it (again *hypokeimenon*). As a result, he posits a certain »something « – space, or *chōra* – that underlies perceptible changes (like matter), but (unlike matter) is not a constituent of any perceptible objects. This very same thing is indeterminately extended (like space), but not causally neutral (like Newtonian space). One promising avenue toward making sense of this constellation is through a return to the idea, regarded in recent years as controversial, that Plato held a broadly Heraclitean view of sensible reality. On such a view, the sensible world cannot be parceled into things or objects; to describe it we need, to put it with Strawson, a »language without individuals.« Such a radical rejection of the ordinary metaphysics of bodily objects carries with it a radically different approach to questions of space.

The Platonic tradition did not for the most part maintain this ambiguous status for *chōra* between space and matter; under Aristotle's influence, Platonists settled on an interpretation of *chōra* as matter. Research within the group traces this development in the Middle Platonists Plutarch and Alcinoüs. In Plutarch the topic is bound together with questions of the origin of evil, on which Plutarch shows a combination of reliance on and independence from Aristotle in his interpretation of Plato. He follows Aristotle in regarding *chōra* in the *Timaeus* as matter, but on the other hand he resists Aristotle's report (*Metaphysics* A 6) that matter for Plato is the source of evil; instead he takes over from Plato's *Laws* the postulate of an evil soul that originates all other evil. In Alcinoüs we find a summary of Timaeian physics, which is often regarded as a faithful one, but can be seen to suffer Aristotelian distortions both in its treatment of *chōra* as matter and in its unwillingness to take seriously Timaeus's composition of material elements (earth, water, etc.) out of geometrical entities.

Related trends led Plotinus to develop an original and historically influential Platonist conception of first (or »prime«) matter. Like his Platonist predecessors, Plotinus accepted Aristotle's interpretation of the »receptacle« in Plato's *Timaeus* as matter, but at the same time reassessed the traditional understanding of what it is to be a material substratum. According to Plotinus's view, certain substrata, including in particular first matter, are not subjects of the properties that inhere in them, in such a way that they would be affected by the acquisition and loss of those properties. This innovative account of the relation between matter and the properties it underlies was motivated by an attempt to defend Platonic views against Aristotle's criticisms, and it represents a unique approach to traditional puzzles about substantial change. Plotinus's new theory of the substratum is foundational for his thesis that prime matter itself is devoid of extensional properties, and provides the relevant context for understanding his metaphorical interpretation of Plato's descriptions of the »receptacle« as »space« (*chōra*) and »place« (*topos*).

1.3 Aristotle in Later Platonism

So much for Aristotle's influence on the interpretation of Timaeian space among later Platonists. But Platonists were also busy interpreting and battling Aristotle himself. This history is examined by way of the commentaries written on Aristotle's *Physics* in the 6th century CE by Simplicius and Philoponus. These commentaries include digressions or ›corollaries‹ in which the authors present their own views in contrast with the Aristotelian theories under interpretation; they also, especially in Simplicius's case, provide a wealth of information about other Neoplatonists's theories of space.

Thus, in Simplicius and Philoponus we find detailed and sympathetic exegesis placed side by side with emphatic criticism and rejection of certain Aristotelian commitments. In one context, the commentator may argue against attributing a certain view to Aristotle on the grounds that this view is absurd and implausible; in the other context, the same commentator may argue that Aristotle's views are, if not absurd and implausible, then at any rate false. The combination is interesting not just because of the innovative literary strategies used to achieve it. It suggests that these commentators wanted to know not just about *space*; they wanted to know *what Aristotle knew* (or thought he knew) about space. They did not interpret Aristotle as an authority through which to arrive at the truth (as one might interpret the Bible, or Marx, or as Platonists read Plato and the Peripatetics read Aristotle), nor as a mere inspiration or foil for better views (as Aristotle treated his own predecessors); apparently, Aristotle's views themselves were valued as objects of knowledge. What motivated this attitude? In part, no doubt, there was an urgent wish to preserve the impressive »pagan« intellectual legacy which had come under threat during the rise of Christianity. This motive is obvious in Simplicius, who sometimes copies out whole passages from books that have become rare and hard to find; for Philoponus (himself a Christian), other motives may be at work.

Simplicius's *Corollary on Place* is our richest source of information for late ancient theories of space and place and for Neoplatonist interpretations of Aristotle's *Physics* 4.1–5. It includes summaries and evaluations of the views of Alexander of Aphrodisias, Iamblichus, Proclus, and Damascius, as well as Simplicius's own theory of space, which differs only in minor details from that of his teacher Damascius. A detailed running commentary is underway, including a reconstruction of Proclus's and Damascius's works *On Place*. Both works are now lost, but were still available to Simplicius, who makes use of them in his *Corollary*. In this context, especially Proclus's view on place as incorporeal light is remarkable for two reasons: (a) it differs fundamentally from other Neoplatonic theories of place, and (b) it was later adopted by the Renaissance philosopher Francesco Patrizi. It emerges that within a Neoplatonic tradition beginning with Iamblichus (3rd century CE), space is considered as a power or force (*dunamis*), a formal principle that actively structures the things that are in space. Neoplatonists derived from Plato's *Timaeus* the idea that cosmic space is ensouled and hence active/dynamic. This is diametrically opposed to Aristotle's notion, rejected by late ancient authors, on which space is regarded as a mere container. The project involves collaboration with Philippe Hoffmann (Paris, Centre national de la recherche scientifique) and Pantelis Golitsis (Aristoteles Archiv, Berlin) who have prepared a new edition of Simplicius' *Corollary on Place* [<http://www.teuchos.uni-hamburg.de/pdf>].

Simplicius's contemporary Philoponus supplements his commentary on Aristotle's *Physics* with two *Corollaries* which offer criticisms of Aristotle's account of *place* and his denial of *void*, respectively. A dissertation project within the group examines these two related texts. One result is that we should distinguish two different strategies in Philoponus for supplementing his running commentary with an exposition of his own views; in terms of this distinction it is better to speak of »digressions on place and void« (because they interrupt the otherwise reigning *theoria-lexis* form of his commentary, whereas the »Corollaries« fit within that form). The dissertation provides a reconstruction of Philoponus's theory of place and positions it in relation to the various Neoplatonist views laid out by Simplicius. Philoponus's insistence on the possibility of void requires, on the one hand, an account of place as something independent enough of bodies so that it can exist while being empty; for a void is precisely an empty place. It also requires answers to Aristotle's arguments against the possibility of motion through a void: explanations why a body falling through empty space will not fall infinitely fast, and why a body thrown through empty space will keep moving once there is nothing around to keep pushing or carrying it. Philoponus answered the latter question by developing an impetus theory of motion, which prefigured and influenced later theories of inertia. Thus his »digression on void« represents a crucial stage between ancient Aristotelian thinking about nature and early modern thinking.

Finally, there is a project on Proclus's epitome of Aristotle's *Physics* 6–8, called the *Elements of Physics*. Modelled after Euclid's *Elements*, Proclus's small treatise consisting of definitions and proofs has always been considered an early and purely »Aristotelian« production by this Neoplatonist. To the contrary, we are convinced that Proclus's method of arranging and summarizing his material displays characteristically Neoplatonic commitments and readings of Aristotle. We are preparing the first English translation with running commentary of the treatise, in which Proclus's interpretation is compared with Themistius's *Paraphrase of the Physics* and, more importantly, with Simplicius's commentary on *Physics* 6–8. It is our (partly confirmed) suspicion that parts of Simplicius's commentary can be traced to the influence of Proclus's epitome.

2 Publications

Beere, Jonathan. 2009. *Doing & Being: An Interpretation of Aristotle's Metaphysics Theta*. Oxford: Oxford University Press.

Helmig, Christoph. 2008. »Weltseele im Welt-Raum oder Welt-Raum in der Weltseele? Die Weltseele (*anima mundi*) und ihr Verhältnis zum Raum im antiken Platonismus und frühen Christentum«. *Jahrbuch der historischen Forschung*. 31–44 [http://www.ahf-muenchen.de/Forschungsberichte/Jahrbuch2008/AHF_Jb2008_FB2_Helmig.pdf].

Helmig, Christoph. 2009. »The Truth Can Never Be Refuted: Syrianus' View(s) on Aristotle Reconsidered«. In Angela Longo (ed.), *Syrianus et la métaphysique de l'antiquité tardive*, Elenchos 51. Naples: Bibliopolis. 347–380.

Helmig, Christoph. 2010. »Proclus' Criticism of Aristotle's Theory of Concept Formation in *Analytica Posteriora* II 19«. In Frans A. J. de Haas – Mariska Leunissen – Marije Martijn (eds.), *Interpreting Aristotle's Posterior Analytics in Late Antiquity and Beyond*, *Philosophia Antiqua* 124. Leiden: Brill.

Helmig, Christoph. Forthcoming. *Ideas and Concepts – Concept Formation in the Platonic tradition. A Study on Proclus and His Predecessors*, Philosophia Antiqua. Leiden: Brill.

Helmig, Christoph – Gregoric, Pavel. Forthcoming. »OMOΣE XΩPEIN: Simplicius, *Corrolarium de loco* 601.26–27«. *Classical Quarterly*.

Helmig, Christoph – Steel, Carlos. Forthcoming. »Proclus«. *Stanford Encyclopedia of Philosophy*, <http://plato.stanford.edu/contents.html#p>

Morison, Ben. 2010. »Did Theophrastus Reject Aristotle’s Account of Place?«. *Phronesis. A Journal for Ancient Philosophy* 55, 68–103.

Mouroutsou, Georgia. 2010. »Die Frage nach der schlechten Seele in dem zehnten Buch von Nomoi: Versuch einer Entmythologisierung«. In Dietmar Koch – Irmgard Männlein-Robert – Niels Weidtmann (eds.), *Platon über das Göttliche*, Antike-Studien 1. Tübingen: Attempto. 139–173.

Mouroutsou, Georgia. 2010. *Die Metapher der Mischung in den Platonischen Dialogen Sophistes und Philebos*, International Plato Studies 28. Sankt Augustin: Academia.

Mouroutsou, Georgia. 2010. »Eikon bei Platon: Metaphysik des Bildes«. In Simone Neuber – Roman Veressov (eds.), *Das Bild als Denkfigur*. Munich: Fink. 33–49.

Opsomer, Jan. 2009. »The Integration of Aristotelian Physics in a Neoplatonic Context: Proclus on Movers and Divisibility.« In Riccardo Chiaradonna – Franco Trabattoni (eds.), *Physics and Philosophy of Nature in Greek Neoplatonism*. Leiden: Brill. 189–229.

Rosen, Jacob – Malink, Marko. Forthcoming. »A Method of Modal Proof in Aristotle«. *Oxford Studies in Ancient Philosophy*, 42, 2012.

3 Invited Talks and Presentations

Beere, Jonathan. »Thinking Thinking Thinking: Aristotle’s *Metaphysics* Λ 9«. Classical Philosophy Conference, 6.–7. December 2008, Princeton University. Also delivered at the Sorbonne, Paris; Oxford University; the University of California, Los Angeles, and the University of Chicago.

Beere, Jonathan. »Faking Wisdom: Plato on Sophistry as an Expertise«. *Conference on Wisdom in Ancient Thought*, 3.–4. April 2009, Columbia University, New York. Also delivered at Oxford University. To appear in the associated volume ed. by Katja Vogt – Wolfgang Mann.

Beere, Jonathan. »The Explanatory Role of the *Chora* in Plato’s *Timaeus*«. New York University, 2010. Also delivered at Stanford University.

Helmig, Christoph. »Plotins Auffassung vom Verhältnis zwischen Weltseele und Universalseele«. *Philosophische und theologische Perspektiven der Weltseele – Teil I: Antike und Spätantike*, Workshop 4.–5. June 2010, Berlin-Brandenburgische Akademie der Wissenschaften, Berlin.

Helmig, Christoph. »Sceptics and Neoplatonists on Space/Place (*topos*) – Continuities and Discontinuities«. *International Workshop on Late Ancient Philosophy*, 24.–25. June 2010, Humboldt-Universität zu Berlin.

Helmig, Christoph. »Particulars, Universals, and Degrees of Universality in Neoplatonism«. *The Problem of Universals in Ancient Philosophy*, Conference 6.–8. September 2010, Pisa (Scuola Normale).

Helmig, Christoph. »Universal Soul and World Soul – Problems of Demarcation in Plotinus and After«. *The World Soul and Cosmic Space*, International Conference 17.–18. September 2010, Humboldt-Universität zu Berlin.

Mouroutsou, Georgia. »The Allegory of the Cave: Methodos and Kathodos«. *The Republic, IX. Platonic Symposium of the International Plato Society*, 1.–8. August 2010, Tokyo, Japan.

Noble, Christopher. »On Intelligible Matter: *Enn.* II.4.4.11–20«. *Plotinus Colloquium*, 14.–15. May 2010, Athens, Greece.

Noble, Christopher. »The Case for Incorporeal Matter in Plotinus and Simplicius«. *International Workshop on Late Ancient Philosophy*, 24.–25. June 2010, Humboldt-Universität zu Berlin.

Noble, Christopher. »No Other Contrary to Circular Motion? *De Caelo* 1.4«. *International Workshop on Aristotle's De Caelo 1*, 20.–22. September 2010, Zadar, Croatia.

Odzuck, Sebastian. »Why Should We Be Interested in What the Primary Kind of Change Is?«. Delivered to Princeton Philosophical Society, Princeton University.

Papachristou, Ioannis. »What is a Corollarium? The Case of Ioannes Philoponus«. *International Workshop on Late Ancient Philosophy*, 24.–25. June 2010, Humboldt-Universität zu Berlin.

Rosen, Jacob. »The Logic of Final Causation in Aristotle«. *How Do Teleological Explanations Work? – Historical Perspectives on Final Causes*, Tagung 27.–28. November 2009, Humboldt-Universität zu Berlin.

Rosen, Jacob. »Aristotle on the Agent and Aim of Change«. University of California, Los Angeles.

Rosen, Jacob – Malink, Marko. »Eternity and Necessity in *De Caelo* 1.12«. *International Workshop on Aristotle's De Caelo 1*, 20.–22. September 2010, Zadar, Croatia. Also delivered at Universität Hamburg. To appear in *Rhizai. A Journal for Ancient Philosophy and Science*.

4 Conferences and Workshops

International Workshop on Late Ancient Philosophy (together with Philipp Hoffmann, Centre national de la recherche scientifique Paris, and Carlos Steel, University of Leuven): »The corollaries in the Commentaries on Aristotle's *Physics* by Simplicius and Philoponus«. 24.–25. June 2010.

International Conference (together with D-I-2 *Anima mundi*): »The World Soul and Cosmic Space«. 17.–18. September 2010.

Summer school and workshop »Plato's *Sophist*«, with Laszlo Bene, Lesley Brown, Sarah Broadie, Amber Carpenter, Irad Kimhi, and Fiona Leigh. 21.–24. September 2009. (Financed by the Schneider-Stiftung.)

5 Seminars

Topoi Research Seminar (Jonathan Beere – Christoph Helmig):

- »Simplicius' *Corollary on Place*«, WS 2008/2009.
- »Aristotle and the Aristotelian Commentators on the Void«, SS 2009.
- »Plato's notion of *chōra* in the *Timaeus*«, WS 2009/2010.
- »Plato's notion of *chōra* in Aristotle and the Later Platonic Tradition«, SS 2010.
- »Aristotle on the Topology of Change and the Priority of Locomotion«, WS 2010/2011.

»Philosophische Themen in antiker Mathematik«, WS 2008/2009 (Jonathan Beere).

»Current Research in Ancient Philosophy«, SS 2009 (Jonathan Beere).

»Zeit, Raum und Veränderung in Aristoteles' *Physik*«, SS 2009 (Jonathan Beere).

»Modal Arguments in Aristotle«, WS 2009/2010 (Jacob Rosen – Marko Malink [D-III-E-2-1]).

»Platons *Staat*«, WS 2009/2010 (Jonathan Beere).

»Simplikios aus Kilikien: Prologe zu den Aristoteleskommentaren«, WS 2009/2010 (Christoph Helmig).

»Philosophie der Mathematik in Hinblick auf ihre Geschichte«, SS 2010 (Jonathan Beere).

»Platons *Timaios*«, SS 2010 (Georgia Mouroutsou).

»Aristoteles' Naturphilosophie«, WS 2010/2011 (Jonathan Beere).

»Aristotle's *Physics* in Late Antiquity: Proclus' *Elements of Physics*«, WS 2010/2011 (Christoph Helmig/Jan Opsomer).

»Der Späte Platon: Der *Politikos*«, WS 2010/2011 (Georgia Mouroutsou).

»Plotinus«, WS 2010/2011 (Christopher Noble).

6 Citation

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