Philosophy of Physics: Space and Time

John Dougherty WiSe 2021/2022

Meeting:	Tuesdays, 14:00–16:00 (c.t.) Schellingstr. 3, Room R209
Office Hours:	Thursdays, 14:00–16:00 (c.t.) Ludwigstr. 31, Room 126
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Overview

Description If I step onto a train in Munich and step off in Berlin, then something has changed about me (namely, my location). So the person stepping onto the train in Munich is different from the person stepping off in Berlin—there are really two people! That's not right: I'm just one person who *moved* from Munich to Berlin. But if I'm the same before and after moving, then I'm no different, so my location can't be different. And anyway, I sat very still when I was on the train, so actually I didn't move at all. Since I didn't move I didn't change my location, and so Munich and Berlin are the same place.

This paragraph is confused and maybe sort of silly. But it's not so easy to say just what's wrong about it. It makes assumptions about identity, change, space, time, and motion. This course is an introduction to the philosophy of physics that focuses on classic philosophical arguments concerning the last of these topics: motion. These begin with ancient Greek paradoxes of continuity, discreteness, and fate, and end with contemporary arguments about the possibility of time travel—stopping along the way at major developments in physics in the seventeenth and twentieth centuries.

Objectives By the end of the course, you should be able to (i) state one or more traditional philosophical problems concerning motion and (ii) explain why they are problems. Exhibiting ability (i) means giving a statement, in academic writing and in your own words, of an argument about motion. Exhibiting ability (ii) means explaining why the argument poses a problem: why someone might want to believe the premises but not the conclusion.

Materials

All materials for this course will be available on LSF.

Assessment

The evaluation for this course will be by means of a term paper submitted at the end of the semester. If you would like to submit a term paper, you must register through LSF during the registration period (17.01.2022–28.01.2022) and submit it to me by email by the term paper deadline (31.03.2022). Please note that extensions of this deadline are not up to me; if you need an extension, please contact Corinna Triffo (`Corinna.Triffo@lmu.de`) at the Prüfungsamt für Geistes- und Sozialwissenschaften (PAGS).

Your paper should be on a topic related to the philosophical issues discussed in this course. Near the end of the semester I will distribute a list of suggested questions and grading criteria. You may write your paper on topic not on that list; if you do, then I recommend speaking to me before writing the paper, so that I can advise on the topic and scope of your planned alternative. The term paper should be 3000 words. It should be written in 12pt font, with 1.5 spacing, 3cm margins on the left and right, and a standard academic typeface (Computer Modern, Times New Roman, Palatino, Calibri, etc.).

Resources

Questions about the administration of philosophy teaching at LMU should be directed to Thomas Wyrwich (`thomas.wyrwich@lrz.uni-muenchen.de`). The Erasmus coordinator for philosophy at LMU is Peter Adamson (`office.peter.adamson@lrz.uni-muenchen.de`). The list of women's representatives (Frauenbeauftragte) for the Philosophy Faculty can be found on the Faculty's webpage (`https://www.philosophie.uni-muenchen.de/fakultaet/frauenbeauftragte/index.html`); the representatives for the MCMP are Silvia Jonas and Marianna Antonutti Marfori. Issues regarding the economic, social, and cultural aspects of student life—including studying with a child or studying with a disability—are the responsibility of the Munich Student Union (`https://www.studentenwerk-muenchen.de`).

Schedule and readings

19.10 The problems of change and motion

- Aristotle, excerpts from *Categories* and *Physics*

26.10 Fatalism

- Aristotle, excerpt from *On Interpretation*
- Cicero, excerpt from *On Fate*

02.11 Motion and the void

- Bradwardine, excerpt from *On the Ratios of Velocities in Motions*

09.11 The Copernican revolution

- Descartes, excerpt from *The Principles of Philosophy*
- Newton, excerpts from *On the Gravity and Equilibrium of Fluids* and *Mathematical Principles of Natural Philosophy*

16.11* Aristotelian and Galilean spacetimes

- Geroch, excerpt from *General Relativity from A to B*

23.11 Leibniz & Clarke

- Excerpt from the Leibniz–Clarke correspondence

30.11 Empiricism and geometry

- Berkeley, excerpt from *On Motion*
- Mach, excerpt from *The Science of Mechanics*

07.12 Handedness

- Kant, "Concerning the ultimate ground of the differentiation of directions in space"

14.12 Simultaneity

- Einstein, excerpt from *Relativity*

21.12* Curvature

- Geroch, excerpt from *General Relativity from A to B*

11.01 Conventionality

- Poincaré, excerpts from *Science and Hypothesis*

18.01 GR

- Geroch, excerpt from *General Relativity from A to B*

25.01 Time travel

- Lewis, "The paradoxes of time travel"

01.02 Time travel II

- Ismael, "Closed causal loops and the bilking argument"

08.02 Time travel III

- Fernandes, "Freedom, self-prediction, and the possibility of time travel"