

Society in physics, physics in society – the social frame of science

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Goethe Universität Frankfurt FB 13 for SFB TRR 288

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Language: English

The Philosophy of Science usually tries to describe the coming-about and the dynamics of large formations of scientific theories. While it may be arguable, to what extent Karl Popper, Thomas Kuhn, Imre Lakatos, Paul Feyerabend and the like succeeded in doing so, they did not only let open fundamental problems of theorizing a Philosophy of Science (as, for example, the problem of induction). More importantly, the Realist Philosophy of Science does not even consider the practical questions, that emerge in our everyday struggle in the laboratories, e.g.:

- How is experimental practice organized?
- How do we justify our readings of experimental results?
- How does our everyday work connect to the theoretical background of physics?
- What is the goal of our everyday work, if we are not inventing grand theories every day?
- What are the mechanisms that keep the scientific venture rolling?
- How (and why) to become a professor eventually?
- What are strategies to communicate science to a large audience, and what aren't?
- How does scientific truth come about, and how large is its sphere of influence?
- What is the role that sciences play in the larger picture of our society?

This seminar, of course, cannot provide satisfying answers to all of these questions. What we will try to do is to build a starting point and a proper vocabulary in order to reflect that type of questions, and also to try and start this process of reflection together.

In the first two thirds of the seminar, we will try to get a feeling for the social processes that govern our everyday work in and around the laboratory by introducing to a field of research and conceptualization that tackles this sort of practical questions of the scientific everyday. We will read some of the basic texts of the so called Sociology of Science (the Strong Programme of the Sociology of Science, to be more precise) that later developed to the field of Science and Technology Studies. The sociologists of science used sociological and ethnographical means of observation of laboratory life to conceptualize the rules that the body of science, that is: a lab group, a university, or a specialised field/network, follows. We will have a look on general conceptions developed by David Bloor, Steven Woolgar and Bruno Latour. Also, we will look at specific examples from the fields of mathematics by David Bloor and of physics by Harry Collins and Bruno Latour.

In the last third of the seminar, we will broaden our canon (while with Zonabend and Latour, we still have sociological texts, with Marcuse and Sokal, also non-sociological texts join in) and try to also shed light on the question, how science connects to the „non-scientific“ society as a whole. With Françoise Zonabend we will explore the role of science as technology and the responsibility to communicate science properly. With Herbert Marcuse we will look at how sciences (and especially physics) shape the concept of truth in modern society. And with Alan Sokal and Jean Bricmond, we not only lend a voice to the most popular critics of the Sociology of Science, but also step down into the trenches of an epistemological skirmish that was fought heatedly between natural sciences and the humanities, and that is referred to as the Science Wars.

When „laboratory“ and „experiment“ are used in the text above, this also refers to computational labs and simulations. This seminar is of interest for theorists and experimentalists alike.

Seminar organization: The seminar will take place via **zoom** (regardless of the state of the pandemic situation), since the seminar will be attended by participants from various locations. If the pandemic situation allows for it, smaller groups of participants are of course invited to meet locally and participate together. **Seminar sessions** are on **Fridays, 4pm – 6pm**, taking place from the **15th of April** until the **15th of July**. The zoom link will be spread via E-Mail, so please **make sure to register in advance to the seminar via E-Mail to marius.peters@physik.uni-frankfurt.de!**

For every seminar session except the first session, there will be literature to be prepared. All texts to read, regardless of their original language, are provided in English. Some of the basic texts do refer to debates of the Philosophy of Science. Hence it would be advantageous to know the basic concepts of Karl Popper's and Thomas Kuhn's theories, but this is by no means mandatory. All the **literature will be shared via Dropbox** with the participants. A link will also be provided via E-Mail. For further details, which text to prepare for which session, see below in the **course outline!**

At least for the first seminar sessions, also **guiding questions** to the texts will be provided and uploaded in advance to the respective sessions in order to give a helpful hand for dealing with the texts. They need not be answered in a written and handed in way, but are only meant to foster your own approaching the texts. When this proves helpful for at least some participants, this practice will be upheld. If not, the practice will later be abandoned. For participants unfamiliar with that sort of sociological and philosophical scientific texts, a rule of thumb for your text preparation planning is, that you will need about one hour per 10 pages of text. Usual text length will be about **30-40 pages of text per session**.

If the participants wish for it, they may write a **text excerpt/position paper** for a session. If they hand this in until **Wednesday before the respective session**, the instructors will read the paper and use it to prepare a discussion that better suits the requirements of the group. There is no obligation to hand in any papers.

Regular participation is not obligatory, but we **encourage participating actively and on a regular basis**. You may also choose to only attend to certain sessions, or to skip certain sessions, but this is not recommended by the instructors.

Certification: This seminar does not provide the opportunity to collect any ECTS credit points. Hence, there also are no requirements of participation, that are non-negotiable.

Literature list:

Bloor, David – Knowledge and social imagery (University of Chicago Press, Second Edition 1991)

Collins, Harry – Changing order: replication and induction in scientific practice (University of Chicago Press, Edition 1992)

Latour, Bruno and Woolgar, Steven – Laboratory Life: the construction of scientific facts (Princeton University Press, 1986)

Latour, Bruno – Do you believe in reality?, in: Pandora's Hope (Bruno Latour's homepage formatted version, drawn from there 2021)

Latour, Bruno – A Relativist Account of Einstein's Relativity, *Social Studies of Science* **18**, 1988

Marcuse, Herbert – One dimensional man (Abacus, 1972)

Sokal, Alan and Bricmont, Jean – Fashionable Nonsense (Picador, 1998)

Zonabend, Françoise – The Nuclear Peninsula (Cambridge University Press, 2007)

Course outline

15.04.2021 Introductory session
No text lecture required

Part One: Science Studies, from a physics view

- 22.04.2021** The Motivation of the Strong Programme
Bloor: Knowledge and Social Imagery, Chapter 1
- 29.04.2021** The Nature of Knowledge and Relations to the Philosophy of Science
Bloor: Knowledge and Social Imagery, Chapter 4
- 06.05.2021** Literary Inscription
Latour, Woolgar: Laboratory Life, Chapter 2
- 13.05.2021** Construction of a Fact: Case Study of Gravitational Waves
Collins: Changing Order, Chapter 4
- 20.05.2021** Scientific Competence
Collins: Changing Order, Chapter 6
- 27.05.2021** Facts, Artifacts and Experimenters
Latour, Woolgar: Laboratory Life, Chapter 4
- 03.06.2021** Cycles of Credibility
Latour, Woolgar: Laboratory Life, Chapter 5
- 10.06.2021** Experience in Mathematics and Logic
Bloor: Knowledge and Social Imagery, Chapters 5 and 7
- 17.06.2021** Building Theory: Case Study of Special Relativity Theory
Latour: A Relativist Account of Einstein's Relativity, *Social Studies of Science* **18**, 1988

Part Two: Politicizing Science

- 24.06.2021** Approaches to Public Conceptions of Science
Collins: Changing Order, Postscript
Marcuse: One Dimensional Man, Chapter 6
- 01.07.2021** The Responsibility of Scientists
Zonabend: The Nuclear Peninsula, Chapters 5 and 6

Part Three: The Science Wars

- 08.07.2021** Fashionable Nonsense?
Sokal, Bricmond: Fashionable Nonsense, Chapter 4
- 15.07.2021** Do you believe in Reality?
Latour: Do you believe in Reality?, Preface to Pandora's Hope