	Topics in class (videos numbered) Lecture 8: **Kuhn's Disciplinary Matrix**	**Readings and study materials after the video lecture**
8.1	Introduction: The problem of objectivity and rationality of science.	Slides + notes of class 8. Crosby Smith: Smith, C., (1986) "Energy" 326-341 in: Geoffrey Cantor et al. (eds.), *Companion to the History of Modern Science* (New York, 1989). Or Hasok Chang: Chang, H. (2011). "The Persistence of Epistemic Objects Through Scientific Change." Erkenntnis **75**: 413-429. [Peter Dear]
8.2	Kuhn's notion of a disciplinary matrix.	
8.3	What are core principles in Kuhn's disciplinary matrix? [1] *Ontological principles*: In order to do science anyway, we need indemonstrable(!) presuppositions that guide our scientific reasoning. Newton called them "rules of philosophizing."	
8.4	What are core principles in Kuhn's disciplinary matrix? [2] *Principles of logic*: Even the rules of logic, such as those originally articulated by Aristotle, are indemonstrable(!) presuppositions that guide our scientific reasoning. These rules have been challenged in modern philosophy of mathematics.	
8.5	What is a metaphysical picture of the world? [1] A general reductionist picture of the world commonly held in the natural sciences.	
8.6	What is a metaphysical picture of the world? [2] A corpuscular picture of the world: the assumption that everything consists of particles and forces between them, which implies for science that everything should be explained in terms of (unobservable) particles and (unobservable) forces between them.	
8.7	How do scientists reason within a paradigm? The example of Sadi Carnot – the inventor of thermodynamics.	
8.8	The change of a paradigm [1]. The change of a metaphysical picture in the history of science affects whether or not a scientific theory is intelligible. Example: From the concept of 'force' to 'energy'.	
8.9	The change of a paradigm [2]. The change of a metaphysical picture. Example: How the concept of aether disappeared.	
8.10	Summary and Conclusions on the role of paradigms in science, and how this idea can help us to understand difficulties of working interdisciplinary.	
8:11	What have we done in this course, and why would an alternative idea about science be helpful for the engineering sciences?	

(Chang 2011)

Chang, H. (2011). "The Persistence of Epistemic Objects Through Scientific Change." Erkenntnis **75**: 413-429.

Why do some epistemic objects persist despite undergoing serious changes, while others go extinct in similar situations? Scientists have often been careless in deciding which epistemic objects to retain and which ones to eliminate; historians and philosophers of science have been on the whole much too unreflective in accepting the scientists' decisions in this regard. Through a re-examination of the history of oxygen and phlogiston, I will illustrate the benefits to be gained from challenging and disturbing the commonly accepted continuities and discontinuities in the lives of epistemic objects. I will also outline two key consequences of such rethinking. First, a fresh view on the (dis)continuities in key epistemic objects is apt to lead to informative revisions in recognized periods and trends in the history of

science. Second, recognizing sources of continuity leads to a sympathetic view on extinct objects, which in turn problematizes the common monistic tendency in science and philosophy; this epistemological reorientation allows room for more pluralism in scientific practice itself.