

Physics needs philosophy. Philosophy needs physics

Philosophy for physicists
Lecture IV

16/03/2026

The importance of Philosophy for Physics

- Anti-philosophical approach is detrimental
- Question our philosophical assumptions of the scientific method

1. Against philosophy
 2. Influence of philosophy on Science in the ancient time
 3. Influence of philosophy on Modern Science
- Passion and research into methodology: that is actually making philosophy!

- S. Weinberg, S. Hawking, N. de Grasse Tyson
 - Refer to the steel-men, not the straw-men
 - Be aware of the historical scenario

- In Athens:
 - The School of *Isocrates*
 - The *Academy*: Plato and Aristotle

⇒ *Protepticus*

- Continuous reference of Science to philosophical positions
(Galileo \Leftrightarrow Aristotle)
 - Impossible to remove the practical application
 - Fundamental questions have triggered the rise of science
(truth, beauty, good)

The world is not organised in academic departments, but rather by questions and “mysteries”

- Quantum mechanics
 - Refusal of any metaphysical assumptions: only observables count
- Relativity
 - Einstein \Leftrightarrow Mach
 - Ian Barbour

Motion and time only relatively to the other objects
(relationally)

Philosophy produces new ideas

1. Not doing philosophy is already doing philosophy

a. Naive neo-positivism

b. Popper \Rightarrow Falsifiability

c. Kuhn \Rightarrow Incommensurability

Science is a network connecting several disciplines: **Ship of Theseus**

Philosophy of science is over

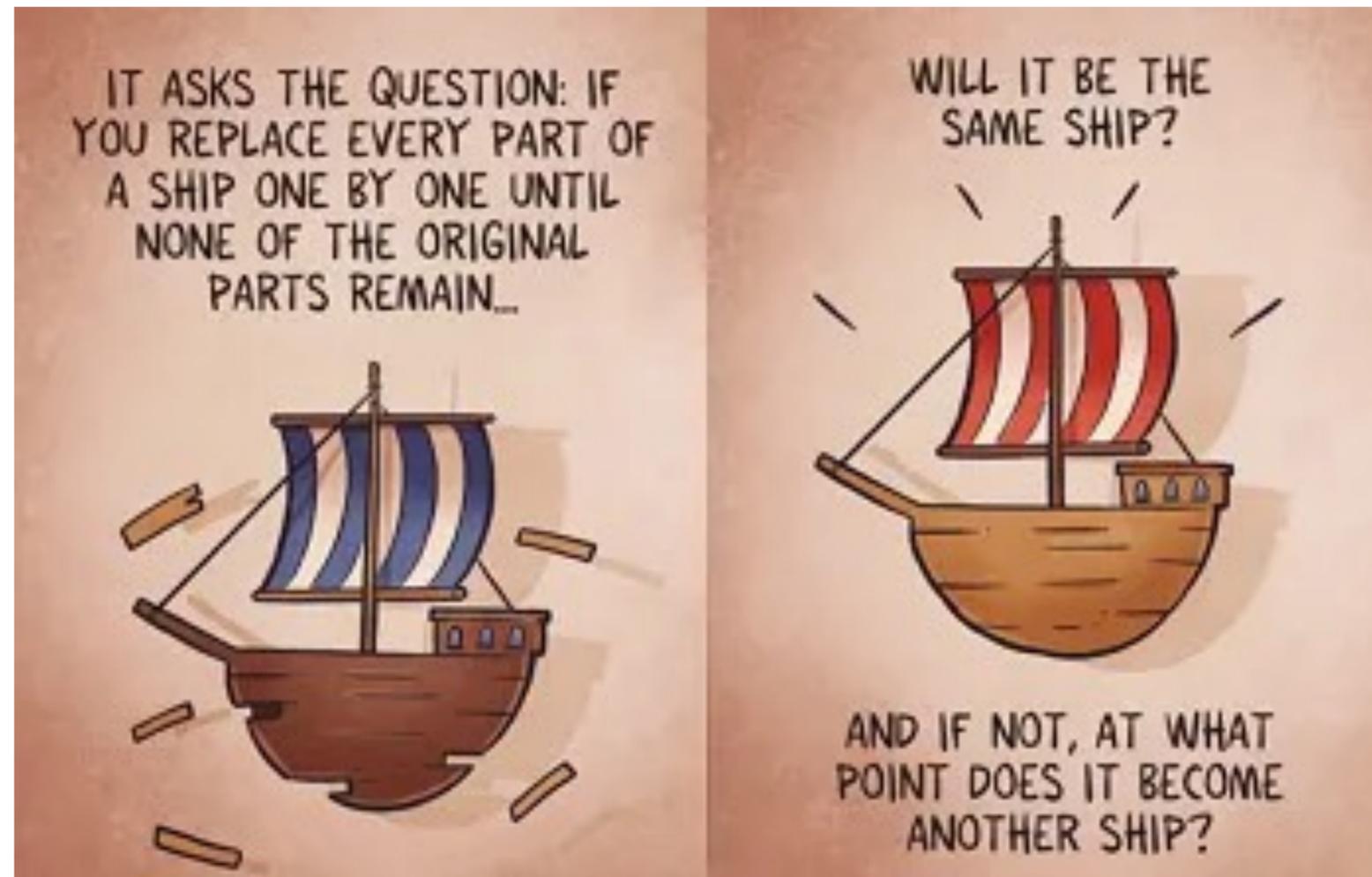
⇒ Aim is to solve the methodological question once for ever

Laws of Nature

- Humean
- Non-humean

Observed data and theory are NOT independent

Crisis in physics (?)



- Sub community unable to interact with each other...
- ... A lot of solid knowledge is generated



- Conservatism and alignment
- Revolutionary approach

Communication: the world is organised by problems, not by academic approaches

Philosophical grounding where perplexity is bigger and more profound

- Against Heideggerian circles

⇒ Good philosophy must be informed by good science

End of the third seminar

For the next seminar(s): Laws of Physics

- Eddy Keming Chen – Laws of Physics (p. 1-11, to the end of 2.2)
<https://arxiv.org/abs/2309.03484>

Optional

- Nancy Cartwright – Do the Laws of Physics State the Facts?
https://joelvelasco.net/teaching/120/cartwright-How_the_Laws_of_Physics_Lie.pdf
- Stanford Encyclopedia of Philosophy – Laws of Nature
<https://plato.stanford.edu/entries/laws-of-nature/>