

# Introduction to Philosophy of Physics Homework 2

Spacetime, special relativity, general relativity, time travel Due: 12 March 2023

---

1. What would it be like to (inertially) travel at 99.99% of the speed of light? [2 point]
2. Using a diagram, explain how inertial observers moving relative to one another disagree about which distant events are simultaneous. [2 point]
3. In general relativity, the debate among different metaphysical positions concerning time (presentism, growing block, eternalism, etc.) gets complicated by two facts. On the one hand, not all general-relativistic spacetimes permit a foliation into time slices. On the other hand, in some spacetimes, there is a naturally privileged choice of foliation into time slices available. What do you think is the impact of these two facts on the metaphysical debate? Explain your answer. [3 points]
4. Approaches to quantum gravity seem to suggest that spacetime is not fundamental, but instead emerges from a non-spatiotemporal structure. Moreover, the emergence of spacetime seems to be contingent, rather than physically necessary. Apart from being unexpected, discuss whether this leads to any interesting philosophical problem. If not, why not? If it does lead a problem, what is the problem? Could it be resolved? How so, or why not? [3 points]