

# Reconsidering Relativistic Causality

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## Abstract

I discuss the idea of relativistic causality, i.e. the requirement that causal processes or signals can propagate only within the light-cone. After briefly locating this requirement in the philosophy of causation, my main aim is to draw philosophers' attention to the fact that it is subtle, indeed problematic, in relativistic quantum physics: there are scenarios in which it seems to fail.

I consign to an Appendix two such scenarios, which are familiar to philosophers of physics: the pilot-wave approach, and the Newton-Wigner representation. I instead stress two unfamiliar scenarios: the Drummond-Hathrell and Scharnhorst effects. These effects also illustrate a general moral in the philosophy of geometry: that the mathematical structures, especially the metric tensor, that represent geometry get their geometric significance by dint of detailed physical arguments.

**Keywords:** relativistic causality, superluminal signalling, quantum electrodynamics, the Drummond-Hathrell effect, the Scharnhorst effect, pilot-wave theory

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