
Summary: This paper is a tour of how the laws of nature can distinguish between the past and the future, or be T-violating. I argue that, in terms of basic analytic arguments, there are really just three approaches currently being explored. I show how each is characterized by a symmetry principle, which provides a template for detecting T-violating laws even without knowing the laws of physics themselves. Each approach is illustrated with an example, and the prospects of each are considered in extensions of particle physics beyond the standard model.

For a response see [A. Ashtekar, ibid. 52, 16–20 (2015; {Zbl} 1329.81028)].

MSC:

81P05 General and philosophical questions in quantum theory
81R05 Finite-dimensional groups and algebras motivated by physics and their representations
81V25 Other elementary particle theory in quantum theory
00A79 Physics

Keywords:
time reversal; T-violation; time; quantum theory

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References:

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