

What Price Determinism? The Hole Story!

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Abstract

In their modern classic "What Price Substantivalism? The Hole Story" Earman and Norton argued that substantivalism about spacetime points implies that general relativity is indeterministic and, for that reason, must be rejected as a candidate ontology for the theory. More recently, Earman has cottoned on to a related argument (in fact, related to a *response* to the hole argument) that arises in the context of canonical general relativity, according to which the enforcing of determinism along standard lines---using the machinery of gauge theory---leads to a 'frozen universe' picture (grounded in an absence of changes in values of general relativity's observables). *Prima facie* this would seem to land the anti-substantivalist in waters at least as deep as those that Earman and Norton argued troubled substantivalism. In this paper I introduce the argument in what I think are clearer terms than Earman's, and assess his treatment of the problem. For the most part I agree with Earman about the nature of the problem, but I find aspects of his discussion wanting, especially as regards his proposed ontology. I argue that ontological sense can be made of the changelessness if a structuralist stance is adopted with respect to a natural class of observables.

Keywords: Hole argument, frozen dynamics, determinism, gauge theory.

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