

Curve It, Gauge It, or Leave It? Practical Underdetermination in Gravitational Theories

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Abstract

Four empirically equivalent versions of general relativity, namely standard GR, Lorentz-invariant gravitational theory, and the gravitational gauge theories of the Lorentz and translation groups, are investigated in the form of a case study for theory underdetermination.

The various ontological indeterminacies (both underdetermination and inscrutability of reference) inherent in gravitational theories are analyzed in a detailed comparative study.

The concept of practical underdetermination is proposed, followed by a discussion of its adequacy to describe scientific progress.

Keywords: general relativity, gauge theory, theory underdetermination, ontological indeterminacy

[Specific Sciences: Physics](#)

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