

Laws, Symmetry, and Symmetry Breaking; Invariance, Conservation Principles, and Objectivity

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Abstract

Given its importance in modern physics, philosophers of science have paid surprisingly little attention to the subject of symmetries and invariances, and they have largely neglected the subtopic of symmetry breaking. I illustrate how the topic of laws and symmetries brings into fruitful interaction technical issues in physics and mathematics with both methodological issues in philosophy of science, such as the status of laws of physics, and metaphysical issues, such as the nature of objectivity.

Keywords: symmetry, invariance, symmetry breaking, gauge symmetry, Noether' theorems, laws of nature

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