A Theory of the Universe from Contemporary Physics: Evaluating Smolin's Argument for the Elimination of 'Ideal Elements'

Cooperman, Joshua Harris (2007) A Theory of the Universe from Contemporary Physics: Evaluating Smolin's Argument for the Elimination of 'Ideal Elements'.

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Abstract

I explore Leibnizian themes in the theoretical physicist's pursuit of a quantum cosmology by examining Smolin's program based on the elimination of ideal elements. These constructs are formal mathematical structures of a physical theory that require for their interpretation the existence of objects external to the system treated by the theory. After introducing some necessary background information, I discuss the particulars of Smolin's definition of ideal elements and analyze his motivations and arguments for the elimination of ideal elements. I then survey and assess his two specific proposals for the construction of a quantum cosmology. The former stems from the canonical approach to the development of a quantum theory of gravity; the latter consists of a series of hypotheses framing a speculative fundamental theory of the universe. Finally, I consider the explicit links and debts of Smolin's program to Leibniz's philosophy.

Keywords:	quantum cosmology, Barbour-Bertotti theory
Subjects:	Specific Sciences: Physics
ID Code:	3894
Deposited By:	Cooperman, Joshua Harris
Deposited On:	16 Febuary 2008
Additional Information:	This entry is my dissertation for the Masters of Philosophy program of the department of history and philosophy of science at Cambridge University.