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# A CRITIQUE OF THE STANDARD COSMOLOGICAL MODEL

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*tutorial*

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**Abstract:** According to the standard cosmological model, 27 % of the Universe consists of some mysterious dark matter, 68 % consists of even more mysterious dark energy, whereas only less than 5 % corresponds to baryonic matter composed from known elementary particles. The main purpose of this paper is to show that the proposed ratio 27 : 5 between the amount of dark matter and baryonic matter is considerably overestimated. Dark matter and partly also dark energy might result from inordinate extrapolations, since reality is identified with its mathematical model. Especially, we should not apply results that were verified on the scale of the Solar System during several hundreds of years to the whole Universe and extremely long time intervals without any bound of the modeling error.

Key words: *Dark matter, dark energy, antigravity, modeling error, manifold, extrapolation, cosmological parameters*

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*Never identify any model with reality.*

## 1. Introduction

In 1584, Giordano Bruno wrote the treatise *De l'Infinito, Universo e Mondi*, where he introduced the hypothesis that the universe is infinite and that each star looks like our Sun. This statement is often considered as the origin of modern cosmology. Isaac Newton and many others envisioned the Universe as the Euclidean space  $\mathbb{E}^n$  for dimension  $n = 3$ .

In 1900, Karl Schwarzschild [60, p. 66] was probably the first person to realize that the Universe could be non-Euclidean, and moreover to have a finite volume. He assumed that it is described by a large three-dimensional manifold, the *hypersphere*

$$\mathbb{S}_r^3 = \{(x, y, z, w) \in \mathbb{E}^4 \mid x^2 + y^2 + z^2 + w^2 = r^2\}. \quad (1)$$

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