

# On the Philosophy of Being and Nothingness in Fundamental Physics \*

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## Abstract

Whenever one constructs a Cantor set, one is in actual fact constructing two Cantor sets. The first is the Cantor set made of the uncountably infinitely many fractal points left and the second is the Cantor set of the infinitely many gaps left between the infinitely many points. The first Cantor set which is measure zero may be set equal to the seeds of existence. The second Cantor set which is surprisingly a measured set with the length of the original interval may be likened to the real vacuum of physics as well as the nothingness of philosophy. The paper considers these issues in the context of art and philosophy, particularly that of Musil, Sartre and Heideger.

**Keywords:** Existentialism, Satre-Heideger quantum mechanics, empty set, E-infinity theory, Cantorian spacetime, the golden mean in quantum mechanics

Humans have an inbuilt intrinsic bias in their psyche against nothingness. Although we fear nothing like nothingness, being associated with death, we still do not regard it as physically real and integrate it on a fundamental level into the foundation of physics. So far we have been content with the zero introduced by the Indians and mediated to Europe by Arab mathematicians who saved our arithmetic and number system from the unbearable heaviness of Roman numbers.

The Author feels that the empty set of the Menger-Urysohn transfinite dimensional theory [1,2] can do for physics what the zero did for mathematics when we extend the empty set  $\dim d_{nu} = -1$  to the totally empty set  $\dim d_{MU} = -\infty$ . It may be instructive at this point to connect a little to fundamental philosophical problems which were considered around the middle of the last century in great depth. In that respect we may mention the views of M. Heideger laid down in his book *Sein und Zeit* and later on the fundamental and famous work of J.P. Sartre, *Being and Nothingness*. In the somewhat flamboyant language of Sartre, he described the embedding of nothingness in being by likening it to a worm inside an apple. At the core of being nothingness is lurking. The exact mathematical formulation of the foundation of physics could similarly not be complete or consistent without including nothingness in the form of the empty set [1,2].

$$d_{MU} = -1,$$

$$d_c^{(-1)} = \phi^2, \quad \phi = (\sqrt{5} - 1)/2$$

and the totally empty set

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and

$$d_{MU} = -\infty$$

$$d_c^{(-\infty)} = 0.$$

The distance between  $d_{MU} = -1$  and  $d_{MU} = -\infty$  is what is termed the degree of emptiness of an empty set [2]. It is highly interesting to note that while too much philosophical interrogation did not help science to start with and a separation between what is empirical and testable and what is idle deep philosophical discussion was recommendable, the situation started changing with relativity and more so with quantum mechanics. Never the less physics did not change in essence with regard to the notion of nothingness. The introduction of the empty set on such a fundamental level clearly shows that our initial reaction to philosophy was misguided. Philosophy is part and parcel of real deep science as will be discussed in some detail in the present paper. In fact quantum physics as well as non-classical geometry has had considerable impact not only on philosophy and visa-versa but also on literature, art and music. The author vividly recalls many passages from Robert Musil's novel "The man without qualities" which has direct bearing on the principles of indistinguishability in quantum mechanics as well as the meaning of the static and the dynamic infinity [3]. Religion has also played a profound role in the development of set theory. We recall that the author replaced calculus in his E-infinity theory with Wyle scaling. In descriptive set theory this is known as Suslin scaling. There were many attempts by the famous Russian "Moscow School of Mathematics" to define God as the set of all sets. In addition the Russian priest and mathematician Pavel Florensky strongly believed in discontinuity as a manifestation of individuality and freedom [4]. The author always maintained that Heisenberg's matrix method was a giant leap forwards but Schrödinger's continuous differential equation was misunderstood and became a leap backwards.

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