

Working outside the mainstream  
during the pre-history of Quantum Gravity:  
The lost honor of Albert Einstein and Léon Rosenfeld.

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**Abstract**

As it has now been recognized, during the pre-history of Quantum Gravity (1916-1930) many of the modern approaches saw the light for the first time. Following the periodization of the history of quantum physics, the first attempts that tried to harmonize the emerging quantum phenomena with the gravitational interaction can be classified as belonging to a mainstream or to an outside-the-mainstream current.

The aim of our talk is to point out the important role played by Albert Einstein's and Léon Rosenfeld's papers published in 1927, notwithstanding these works be usually underestimated or completely forgotten. Indeed, in his Einstein biography, Abraham Pais asserted that he could not understand the reasons that pushed Einstein to send to the Prussian Academy of Sciences the two brief communications he wrote on Kaluza's five-dimensional theory. This question seems to be yet unanswered. On the other side, Rosenfeld, interviewed by Thomas Kuhn and John Heilbron, declared, about his earliest production, that ‘was more of an accident’.

Both authors, though for different reasons, can be considered as working outside the mainstream in 1927. First, by reconsidering Einstein's correspondence and his 1927's work, we argue that he gave fundamental contributions to the constitution of the modern concept of physically real extra-dimensions. Second, by briefly analysing Rosenfeld's earliest work and contrasting it with his later paper (1930), we argue how he was a pioneer of the so-called semi-classical approach long before the birth of Quantum Field Theory on curved backgrounds.

Nowadays, both the concept of extra-dimensions and the semi-classical approach are two important ingredients of the modern Quantum Gravity framework.

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