

Swoje rozważania chciałbym zakończyć stwierdzeniem, że pierwszym urzeczonym pięknem OTW był sam jej twórca, który swój komunikat dla Pruskiej Akademii Nauk z dnia 25 listopada 1915 roku, zawierający równanie pola grawitacyjnego, zakończył słowami: „Każdy, kto w pełni zrozumie tę teorię, musi ulec jej magii”.

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### The beauty of the general theory of relativity

ABSTRACT. The aim of this paper is to present the beauty of the general theory of relativity (GTR). The paper also explains what the beauty and elegance (“perfection”) of a scientific theory is according to Einstein. In Einstein’s opinion, the inner perfection of a theory is primarily about its logical simplicity, which is mainly based on a theory’s informational content as well as the number of its fundamental assumptions – the smaller the number of the initial statements of a theory (postulates and principles) and the greater the number of its logical consequences (including empirical consequences), the simpler the theory in terms of its logic. Further determinants of the inner perfection of a theory, according to Einstein, are: a theory’s mathematical simplicity (a set of simple mathematical methods which constitute the formal structure of a theory), definiteness, naturalness and logical closedness. These criteria, especially the criterion of logical

simplicity, which is the main goal of scientific research, constituted the methodological principles that Einstein followed when constructing the GTR.

In the second part of the paper the author shows that the GTR has achieved a much higher level of “inner perfection” than Newton’s classical mechanics, when considered together with his theory of gravity. Moreover, it turns out that the GTR’s logical and mathematical beauty was not achieved immediately and at once. Because the logical and mathematical structure of this theory was simplified – as a result of (1) deriving equations of motion from field equations (which was done by Einstein’s and Fock’s teams in 1937 and 1938); and (2) introducing global methods for studying the properties of space-time (which were originated by Gödel in 1949 and elaborated by Penrose, Geroch and others) – the GTR has achieved logical compactness, which, according to physicists, makes it the most beautiful physical theory that has ever been formulated.

**KEY WORDS:** general theory of relativity (GTR), Einstein, beauty of the theory, inner perfection of the theory, logical simplicity of the theory, mathematical simplicity of the theory

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