

This thesis explores the continuous and distributional descriptions of impulsive gravitational waves, focusing on nonexpanding and expanding waves propagating in Minkowski, de Sitter, and anti-de Sitter backgrounds. It employs cut-and-paste techniques and sandwich wave solutions to illustrate the construction of these models. Their influence on free test particles is examined. The research should highlight mathematical implications and delicacy related to the appearance of Dirac δ -distribution in curvature tensors and provide deeper insight into the shift and refraction of geodesics interacting with the expanding gravitational impulses. These findings should contribute to a better understanding of low-regularity space-times in general.

Absract

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1 Introduction