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> **Degree programme**

Degree programme	Thesis type
Physics	Bachelor's Thesis

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Original title

Revealing unique scattering amplitudes from hidden zeros in Tr(ϕ^3) and NLSM Theories

Abstract of thesis

This study investigates unique scattering amplitudes arising from hidden zeros of colored-ordered scalars in Tr(ϕ^3) and Non-Linear Sigma Model (NLSM) theories. Exploiting the combinatorial and geometric properties of the scalar's theoretical amplitudes, the general prediction is made and further simplified using the hidden zeros. Detailed analysis was done of various n-point interactions, including 4-point, 5-point, 6-point, and 7-point interactions within Tr(ϕ^3) theory and 6-point and 8-point interactions within NLSM, to validate the simplification and significance of these hidden zeros. The results reveal unique and simplified amplitude equations, demonstrating the effectiveness of hidden zeros and locality constraints in yielding symmetrical and minimal sets of terms. These insights contribute to the broader understanding of scattering amplitudes and suggest potential applications in more complex field theories.

Number of pages	55
Language of the thesis	English
Year of publication	2024

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