

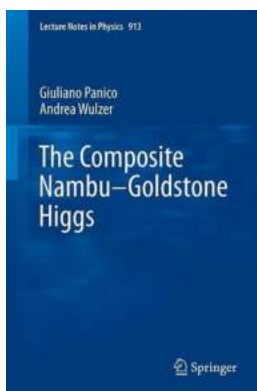
# The Groundbreaking Lecture Notes on the Composite Nambu Goldstone Higgs

The Composite Nambu Goldstone Higgs (CNGH) is an innovative concept that has revolutionized the field of particle physics. In the Lecture Notes In Physics 913, researchers have comprehensively explored and presented the intricacies of this groundbreaking theory. This article aims to provide an informative overview of the CNGH, delving into its significance and potential implications.

## Understanding the Composite Nambu Goldstone Higgs

The Composite Nambu Goldstone Higgs theory proposes a novel explanation for the mechanism behind electroweak symmetry breaking (EWSB). It posits that the Higgs boson is not a fundamental particle but rather a composite particle formed through a strong interaction among other elementary particles. This theory offers a new perspective on the origin of mass and the nature of the Higgs boson.

Unlike the Standard Model, which introduces a fundamental Higgs scalar field, the CNGH theory suggests that the Higgs boson emerges as a result of Goldstone bosons becoming composite particles due to strong interactions. This compositeness is associated with a new strong force, which plays a key role in the formation of the Higgs boson.



## The Composite Nambu-Goldstone Higgs (Lecture Notes in Physics Book 913)

by Daniel Parlegreco (1st ed. 2016 Edition, Kindle Edition)

★★★★☆ 4.6 out of 5

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File size : 10130 KB

Text-to-Speech : Enabled

Screen Reader : Supported



## **The Role of Symmetry Breaking**

In the CNGH theory, electroweak symmetry breaking occurs due to the condensation of bound states formed by fermions and anti-fermions. This breaking of symmetry leads to the emergence of mass for gauge bosons, such as the W and Z bosons, while also giving rise to the Higgs boson as a composite particle. The CNGH theory unifies the concept of symmetry breaking with the origin of mass, providing a more elegant and comprehensive framework.

## **Renormalization and Quantum Corrections**

One of the key aspects of the CNGH theory is its ability to address the hierarchy problem. The hierarchy problem refers to the large discrepancy between the weak scale and the Planck scale, which the Standard Model struggles to explain. Through the mechanism of compositeness, the CNGH theory offers a natural solution to this problem, making it a compelling alternative to the Standard Model.

Additionally, the CNGH theory predicts the existence of new resonances, which can be probed through experimental observations and particle colliders. These resonances provide a unique opportunity to test the validity of the CNGH theory and potentially uncover new physics beyond the Standard Model.

## **Implications and Future Prospects**

The lecture notes on the Composite Nambu Goldstone Higgs open up exciting prospects for further research and exploration in the field of particle physics. The CNGH theory has the potential to shed light on various open questions, such as

the nature of dark matter, neutrino masses, and the unification of fundamental forces.

Moreover, the experimental verification of the CNGH theory would have profound implications for our understanding of the universe and its fundamental building blocks. It could potentially lead to significant advancements in technology and pave the way for breakthroughs in energy harnessing, quantum computing, and more.

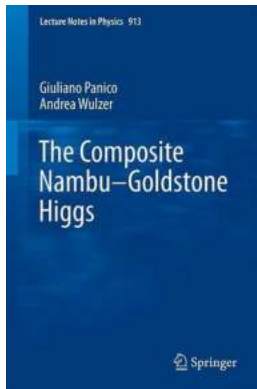
## **Collaborative Efforts and International Research**

The study of the Composite Nambu Goldstone Higgs is a field that requires collaboration and interdisciplinary efforts. Researchers from around the world are actively engaged in investigating the intricacies of this theory, striving to refine its predictions and develop experimental strategies for its validation.

The Lecture Notes in Physics 913 serve as an invaluable resource bringing together the latest findings, theoretical advancements, and experimental endeavors. They offer an opportunity for physicists and enthusiasts alike to dive into this exciting realm of scientific exploration.

The Composite Nambu Goldstone Higgs has emerged as a captivating concept that challenges our preconceived notions about the nature of fundamental particles and the origin of mass. The Lecture Notes In Physics 913 provide a comprehensive and engaging exposition of this groundbreaking theory, shedding light on its implications and potential advancements in the field of particle physics. The future of the CNGH theory holds exciting possibilities for unraveling the mysteries of the universe and paving the way for scientific breakthroughs.

## **The Composite Nambu-Goldstone Higgs (Lecture Notes in Physics Book 913)**



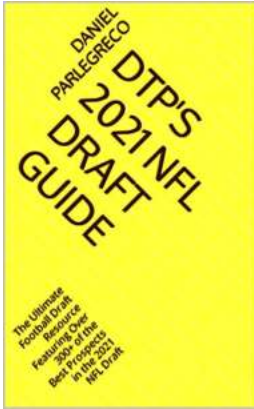
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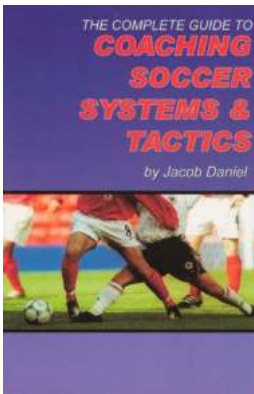


The Hierarchy Problem is arguably the most important guiding principle concerning the extension to high-energy scales of the Standard Model (SM) of Fundamental Interactions. Every scenario for addressing this issue unavoidably predicts new physics in the TeV energy range, which is currently being probed directly by the LHC experimental program. Among the possible solutions to the Hierarchy Problem, the scenario of a composite Higgs boson is a very simple idea and a rather plausible picture has emerged over the years by combining the following ingredients: First, the Higgs must be a (pseudo-) Nambu-Goldstone boson, rather than a generic hadron of the new strong sector. Second, through the so-called ‘partial compositeness’, SM particles mix with strong sector resonances with suitable quantum numbers, so that they become a linear combination of elementary and composite degrees of freedom. Recently, general descriptions of the Composite Higgs Scenario were developed which successfully capture the relevant features of this theoretical framework in a largely model-independent way. The present book provides a concise and illustrative to the subject for a broad audience of graduate students and non-specialist researchers in the fields of particle, nuclear and gravitational physics.



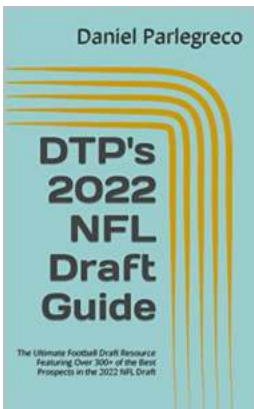
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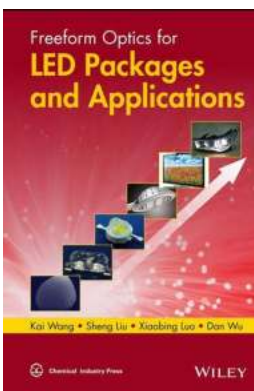
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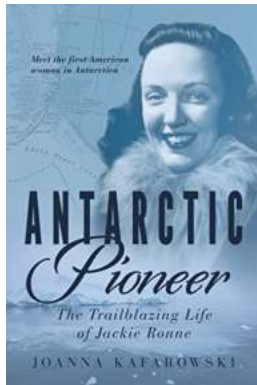
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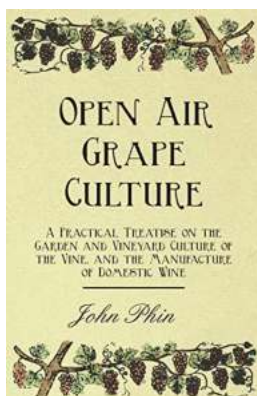
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