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What is an intuitive explanation of Yang-Mills theory? - Quora

Also included are discussions of the caloron center versus its periphery, the role of the thermal ground state in U(1) wave propagation, photonic particle–wave duality, and calculational intricacies and book-

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keeping related to one-loop scattering of massless modes in the deconfining phase of an  $SU(2)$  Yang–Mills theory.

Quantum gauge theory - Wikipedia  
 $G$ , and construct the corresponding Yang-Mills theory. As an example,

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I ' ll explain how Maxwell ' s equations can be regarded as a Yang-Mills theory with gauge group  $U(1)$ . I won ' t explain the  $U(1) \times SU(2) \times SU(3)$  Yang-Mills theory in any detail, but in principle it is easy to construct using the recipe I will explain.



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Yang–Mills theory - Wikipedia

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by a non-abelian gauge theory in which the gauge group is  $G = \text{SU}(3)$ . The additional fields describe, at the classical level, “quarks,” which are spin  $1/2$  objects somewhat analogous to the electron, but transforming in

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the fundamental representation of  $SU(3)$ . The non-abelian gauge theory of the strong force is ...

The Yang–Mills Model | Articles |  
Inference: International ...

Quantization Gauge fixing. In  
quantum physics, in order to quantize

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a gauge theory, for example the Yang–Mills theory, Chern–Simons theory or the BF model, one method is to perform gauge fixing. This is done in the BRST and Batalin-Vilkovisky formulation.. Wilson loops. Another method is to factor out the symmetry by dispensing with vector

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potentials altogether (since they are not ...

Quantum Yang–Mills Theory - Arthur Jaffe

Many physical theories have symmetries, which have important consequences. For example, in

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Newtonian mechanics, if we imagine a coordinate system (i.e. a grid) covering all of space, if we move the origin (i.e. the point  $(0,0,0)$ ) to a different po...

Quantum Yang-Mills Theory in Two Dimensions - YouTube

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Yang–Mills theory is a gauge theory on a given 4-dimensional (pseudo-)Riemannian manifold  $X$  whose field is the Yang–Mills field – a cocycle  $H(X, \mathbf{B}U(n))$  in differential nonabelian cohomology represented

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by a vector bundle with connection  
– and whose action functional is

Quantum field theory - Wikipedia  
The mass gap problem of Yang-Mills theory is formulated as follows [12]:  
"Prove that for any compact simple gauge group  $G$ , a non-trivial quantum

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Yang-Mills theory exists on  $\mathbb{R}^4$  and has a mass gap ...

Vacuum and color confinement in quantum Yang-Mills theory  
However, the quantum Yang-Mills theory (no quarks) with a non-abelian gauge group is an exception. It has a



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property known as asymptotic freedom, meaning that it has a trivial UV fixed point. Because of this, this is the simplest model to pin our hopes on for a nontrivial constructive QFT model in 4D.

Yang–Mills and Mass Gap | Clay

*Page 17/34*

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Mathematics Institute

Examples include string theory and  $N = 4$  supersymmetric Yang–Mills theory. [25] According to Wilson's picture, every QFT is fundamentally accompanied by its energy cut-off , i.e. that the theory is no longer valid at energies higher than , and all

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degrees of freedom above the scale are to be omitted.

5 An introduction to Yang-Mills theory - Michael Nielsen

Almost half a century ago, Yang and Mills introduced a remarkable new framework to describe elementary

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particles using structures that also occur in geometry. Quantum Yang-Mills theory is now the foundation of most of elementary particle theory, and its predictions have been tested at many experimental laboratories, but its mathematical foundation is still unclear.

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## 2. Yang-Mills Theory - University of Cambridge

Quantum theory suggests that the self-interacting particle avatars of gravitational waves are massless spin-2 gravitons, particles unlikely to be directly observed due to the

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weakness of gravitational forces. ...  
the magnetic moment of  
Schwinger ' s  $Z_{\pm}$  had to be that of a  
Yang–Mills gauge theory.

Quantum Yang Mills Theory The  
Yang–Mills theory is a gauge theory

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based on a special unitary group  $SU(N)$ , or more generally any compact, reductive Lie algebra. Yang–Mills theory seeks to describe the behavior of elementary particles using these non-abelian Lie groups and is at the core of the unification of the electromagnetic

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force and weak forces (i.e.  $U(1) \times SU(2)$ ) as well as quantum chromodynamics, the theory of ...

Yang-Mills theory | physics |  
Britannica

Quantum Field Theory. One can find very strong words denouncing them,



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belonging to the great figures of several generations, such like Dirac, Feyn-mann and others. However I shall try to show, that the infinities in the Yang-Mills theory are beneficial — they lead to appearance of the dimensional parameter after the quantization of this ...

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Yang-Mills Theory - Art of Problem Solving

Research video based on the papers arxiv:1508.06305, arxiv:1601.04726, arxiv:1607.07463. Part One (general introduction): 0:26 - two paradigms for understand...

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Mass in Quantum Yang-Mills Theory - arXiv

Yang-Mills is a strongly coupled quantum field theory, whose low-energy dynamics looks nothing at all like the classical theory. Our understanding of quantum Yang-

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Mills is far from complete, but we will describe some of the key ideas from Section 2.4 onwards. A common theme in physics is that Nature enjoys the rich and subtle: the most

The Thermodynamics of Quantum  
Yang–Mills Theory

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A microscopic description of vacuum structure and color singlet quantum states in Yang-Mills theory is presented. Our approach is based on an idea that classical stationary solutions defining a Hilbert space of one particle quantum states possess quantum stability and symmetry

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under Weyl color group transformations. We demonstrate that Weyl symmetry and stability condition provide color ...

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Quantum Yang–Mills Theory Arthur

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Jaffe and Edward Witten 1. The Physics of Gauge Theory Since the early part of the twentieth century, it has been understood that the description of nature at the subatomic scale requires quantum mechanics. In quantum mechanics, the position and velocity of a particle

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are noncommuting operators

QUANTUM YANG–MILLS THEORY  
The Physics of Gauge Theory  
Yang-Mills theory, in physics, a  
generalization of Scottish physicist  
James Clerk Maxwell ' s unified  
theory of electromagnetism, also



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known as Maxwell ' s equations, used to describe the weak force and the strong force in subatomic particles in terms of a geometric structure, or quantum field theory. The Yang-Mills theory relies on a quantum mechanical property called the “ mass gap. ”

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