ゲージ場の理論の非摂動的解析方法の開発と応用

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2006 Fiscal Year Final Research Report Summary

Development and Application of Non-Perturbative Method to Analyze Gauge Field Theories

Research Project

Project/Area Number

13135211

Research Category

Grant-in-Aid for Scientific Research on Priority Areas

Allocation Type

Single-year Grants

Review Section

Science and Engineering

Research Institution

Kanazawa University

Principal Investigator

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Project Period (FY)

2001 – 2006

Keywords

non-perturbative method / gauge theory / renormalization group / spontaneous symmetry breaking / soliton / skyrmion / hierarchy problem / higgs particle

Research Abstract

K-I. A studied the non-perturbative renormalization group method to investigate the dynamical chiral symmetry breaking in gauge theories. The mean field method so far like the Schwinger-Dyson equation suffers a serious gauge dependence. The non-perturbative renormalization group beta functions can be improved to give less gauge dependent physical results by taking account of non-ladder type diagrams. The chiral phase structures in the hot and dense QCD matter is a hot topic in the high energy physics and nuclear physics, and the non-perturbative renormalization group beta function in the hot and dense states are evaluated and the importance of the effective potential and the Lorentz non-invariant operators are found. Also, the infinite range interactions are studied with the simplest Ising model. Introducing a new method of finite range scaling, we evaluate the critical coupling constant and the exponent by referring to the zeta function.
M. H investigated Skyrme model and Fadeev model ···▾ More

Research Products (54 results)

All | 2006 | 2005 | 2004 | 2003 | 2002 | 2001

All | Journal Article

[Journal Article] Fine-tuning in the gauge Mediated supersymmetry breaking models and the induced top Yukawa coupling 2006

[Journal Article] Dynamical realization of democratic Yukawa matrices and alignment of A-terms 2006

[Journal Article] Estimation of the Lin-Yan bound of the least static energy of the Faddeev model 2006

[Journal Article] Restricting profile function of hedgehog Skyrmion 2006

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[Journal Article] Large Mass Scale by strong Gauge Dynamics with Infrared Fixed Point 2005

[Journal Article] Democratic mass Matrices induced by strong gauge dynamics and large mixing angles for leptons 2005

[Journal Article] Induced top Yukawa coupling and suppressed Higgs mass parameters 2005

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