TH2015 Poster Abstract

1 Satoshi Akagi

Nagoya University

New model of massive spin-two particles in curved space

Recently, the new interaction terms called the pseudo-linear terms that can be added to the Fierz-Pauli Lagrangian without inducing g modes have been proposed. We consider the model by including the pseudo-linear terms to the Fierz-Pauli Lagrangian and we couple th model with external gravity. Then we find that the interaction terms without derivatives can be extended to the model in the curved without excitation of ghost-modes. On the other hand, we find that the derivative interaction term induces a ghost-mode in general new non-minimal couplings do not induce a ghost-mode.

In this talk, I discuss the analysis of the extension to the pseudo-linear theory in the curved space.

2 Sadataka Furui

Teikyo University

Triality selection rule of octonion and quantum mechanics

'E. Cartan のスピノル理論ではDiracスピノルは八元数で表され、2つの成分をもつベクトル場と相互作用し，G_23，G_12，G_123，G_13，G_132で表る変換で入れ替わるTriality対称性をもつ。この理論が半導体回路のMemristorやπ中間子、η、η'中間子の2光子への変換や宇宙空間のdark ma dark energyを理解するのに合っていることを説明する。

3 Kanato Goto

Tokyo University

On the entanglement entropy between two interacting strings

Stringの崩壊や散乱で生じる2つのstringの状態は互いにエンタングルしていると期待される。本研究ではstringの散乱を考え、終状態の2つのst状態間のエンタングルメントエントロピーを計算する。このstringの散乱を2次元量子重力の観点から理解するために、semi-classical limitにおける いを議論する。

4 Yuta Hamada

Kyoto University

Eternal Higgs inflation

We investigate the trans-Planckian form of the Higgs potential in the superstring theory, under the assumption that the supersymme broken at the string scale~Ms. We identify the Higgs field as a massless state of the string, which is indicated by the fact that the Higgs mass can be zero around Ms. We find that the large field limit can be classified into three types: runaway, periodic, and chaoti these cases fit in the picture that the Higgs field is the source of the eternal inflation. The first case has a runaway vacuum that corresponds to opening up an extra dimension, with vanishing energy. The smallness of the cosmological constant of our universe can explained if this vacuum is degenerate with ours, as is suggested by the multiple point principle.

5 Masashi Hamanaka

Nagoya University

ADHM Construction of Noncommutative Instatons

Atiyah-Drinfeld-Hitchin-Manin (ADHM) construction is a powerful construction method of instantonse. This is based on a beautiful duali between moduli space of the instantons and moduli space of the ADHM data. In this presentation, we discuss the ADHM construction o U(N) instantons in noncommutative (NC) space and prove the duality. This is based on collaboration with Toshio Nakatsu (Setsunan University).

6 Kyosuke Hirochi

Kazan(Volga Region)Federal Univ. RUSSIA

Hairy black hole solutions for curvature-squared gravity

We study black hole solutions with a scalar hair and the properties of thermodynamics for these black holes in curvature-squared gra with a non minimally coupled scalar field.

7 Shoichi Ichinose

Shizuoka University

Non-Equilibrium Statistical Approach to Fluctuation of Radiated Field and Unruh Effect

When an electron accelerates in the vacuum, it radiates the electromagnetic wave.
The system of 'photons' and the electron obeys the non-equilibrium statistical mechanics.
The (local) temperature distribution and the pressure distribution vary with time.
They reach the equilibrium state or the steady state after the enough time. How to evaluate the fluctuation effect is the important problem.
Recently we have treated the 1D viscoelastic fluid-matter based on the velocity-field theory using the discrete Morse theory. (JPS Conf.Proc. 1, 012132; arXiv:1303.6616(hep-th))
It is a new approach to the non-equilibrium system. It has some advantageous points compared with the ordinary treatment. We list th characteristic points.
1) The formulation is based on the velocity-field theory.
2) The collision term (interaction part) of Boltzmann's equation is explicitly obtained.
3) Besides the ordinary potential (ex. gravitational potential), the velocity-potential is naturally introduced.
4) The distributions of temperature, pressure and density are systematically expressed as some-power moments in the velocity space They give the conditions to (approximately) solve the distribution function in the numerical simulation.
5) The fluctuation is evaluated by the summation (integral) over the possible distributions of the velocity-field. It is expressed by t path-integral.
6) We do not use the time variable. Instead we use the step-flow number.
The time development is the increase of the step-flow number.
The 'time-arrow' is build in this formalism.
7) This step-flow formalism makes us properly treat the energy dissipation.
8) The formalism is useful for the computer simulation such as Lattice Boltzmann Method".

8 Hiroshi Isono

National Tsing Hua University TAIWAN

Note on the self-duality of gauge fields in topologically nontrivial spacetime

We show the derivation of the self-duality relation of abelian higher-form gauge field strength in the topologically nontrivial spacetim background. The so-called Pasti?Sorokin?Tonin action for the self-dual abelian gauge field assumes that the spacetime topology is tri derive the self-duality relation using a gauge transformation of the action. In this paper we find a new gauge transformation of the theory and show that this new gauge transformation enables us to derive the self-duality relation even in the topologically nontrivial spacetime background.

9 Yuta Ito

KEK

Numerical studies of the IR cutoff effects in the Lorentzian IIB matrix model

In recent numerical studies on the Lorentzian type IIB matrix model, it was suggested that 3d space starts to expand exponentially t the (9+1)d spacetime predicted by superstring theory.
It was also suggested that the expanding behavior changes into a power law at later times.
In this work we study the Schwinger-Dyson equation numerically to study the effects of the IR cutoffs introduced in the model. In particular, we reconsider the way to introduce the IR cutoff, and discuss the correct way to take the large-N limit.

10 Takashi Kameyama

Kyoto University

Recent progress in the q-deformed AdS_5xS^5 superstring

We study a GKP-like classical string solution on a q-deformed AdS_5xSˆ5 background and

argue the spacetime structure by using it as a probe. The solution cannot stretch beyond the singularity surface and this result ma suggest that the holographic relation is realized inside the singularity surface. This observation leads us to introduce a new coordina system which describes the spacetime only inside the singularity surface. With the new coordinate system, we study minimal surfaces i q-deformed AdS_5xSˆ5 background.

11 Chung Wen Kao

Chung Yuan Christian Univ. TAIWAN

Dihadron Fragmentation functions in nonlocal chiral quark model

We have calculated the unpolarized dihadron fragmentation functions (uDiFFs) of pions and kaons using the nonlocal chiral-quark model (NLChQM) and evolved our results to the transferred momentum scale Qˆ2=4¥mathrm{GeV}ˆ2 by the QCD evolution equations. These uD have also been computed in the Nambu--Jona-Lasinio-jet (NJL-jet) model for the sake of comparison. We find that there is substant difference between the results of these two models. Furthermore, the DiFFs of u¥to ¥piˆ{+}¥piˆ{-} and g¥to ¥piˆ{+}¥piˆ{-} at Qˆ2=10 mathrm{GeV}ˆ2 in these two models are presented in comparison with the parametrizations fitted by the Monte Carlo event generator JETSET.

12 Aya Kasai

Kyushu Universtity

Decay of False Vacuum via Fuzzy Soliton

We investigate dielectric branes in false vacua in string theories. The dielectric branes are supported against collapsing by lower ene vacua inside spherical or tube-like branes. We claim that such dielectric branes can be seeds for semi-classical (or quantum mechanica decay of the false vacua, which makes the life-time of the false vacua shorter. Also, we discuss a topology change of a bubble corresponding to the Fuzzy monopole triggered by dissolving the fundamental string.

13 Taishi Katsuragawa

Nagoya University

Stability and Anti-evaporation of the Schwarzschild-de Sitter Black Holes in Bigravity

We study the stability under the perturbation and the related anti-evaporation of the Nariai space-time in bigravity. If we impose sp condition for the solutions and parameters, we obtain asymptotically de Sitter space-time, and show the existence of the Nariai space as a background solution. Considering the perturbation around the Nariai space-time up to first order, we investigate the behavior o black hole horizon. We show that the anti-evaporation does not occur on the classical level in the bigravity.

14 Kiyoharu Kawana

Kyoto University

Weak Scale From the Maximum Entropy Principle

The theory of multiverse and wormhole suggests that the radiation S of the universe at the late stage should become as large as possible. We call this the maximum entropy principle (MEP). In this poster talk, we show that the Higgs expectation value v_{h} can be at O(200GeV) from this principle. Namely, we regard S as a function of v_{h}, and show that S actually becomes maximum around O(200GeV).

15 Meguru Komada

Nagoya University

The Born-infeld gravity in the Palatini formalism and the formation of the black hole

We consider a theory of the modified gravity called the Born-infeld gravity in the Palatini formalism (the Eddington inspired gravity). this theory, the behavior of the FLRW universe with dust is different from that of general relativity. The Big Bang singularity does always emerge but the scale factor can be bounced. By using the behavior, we investigate the problem of the formation of the black by considering the spherically symmetric collapse of dust ball. The condition that the black hole horizon is formed is found for the bl hole mass. Furthermore we find that even if the horizon is formed, the dust ball does not always collapse into a singularity but a re object is left. The behavior of the remnant is similar to that of the quantum remnant object called Planck star”.”

16 Hirosuke Kuwabara

Tokyo Metropolitan University

Time Dependent Pais-Uhlenbeck Oscillator and its decomposition

We extended the 4th order Pais-Uhlenbeck(PU) oscillator to the time dependent one. We found a coordinate transformation which can separate Hamiltonian of the time dependent PU oscillator. Especially, I show that it is available to apply this Hamiltonian to some cases example, $¥omega(t) = ¥omega(t + ¥Omega)$(Floquet type) and $¥omega(t) = ¥e^{¥gamma t}$(Bessel type). Here $¥Omega,¥gamma$ ar constant.

17 Mikoto Matsuda

The Graduate University for Advanced Studies

Determination of the Conformal Anomaly Terms in QCD on the Curved Space-time

We expect that the action of the theory can be determined by some symmetries but there exist ambiguities that the effective theor with gravity is not determined uniquely just by the symmetries. We study the renormalization group equation of the trace of the str energy tensor at all loop order with a dimensional reguralization method, then we can resolve the ambiguity of the conformal anomalies one loop level and determine their form.

18 Hironori Mori

Osaka University

The gravity dual of supersymmetric Renyi entropy in two dimensions

We focus on the supersymmetric Renyi entropy on the branched two-sphere which has conical singularities on the north and the south We found that the supersymmetric Renyi entropy computed by using the localization does not depend on the parameter characterizing geometry of the branched sphere. On the gravity side, we investigate this background independence by calculating the dual quantity BTZ black hole.

19 Mitsuhiro Nishida

Osaka University

Frustration in Holography

Frustration is an important phenomenon in condensed matter physics. We consider a holographic superconductor model with three scala fields and Josephson coupling. Three scalar fields and the Josephson coupling are important for frustration. We analyze free energy solutions of the model to determine ground states. We find chiral ground states which show frustration.

20 Tomoki Nosaka

Kyoto University

Exact Instanton Expansion of Superconformal Chern-Simons Theories from Topological Strings

From the large N behavior of their partition functions, some 3d superconformal Chern-Simons theories, including the ABJM theory, are believed to describe the M2-branes in various backgound geometry.
In the purpose of understanding M-theory beyond the supergravity, it should be important to understand also the sub-leading behavi these partiton functions in the limit of large N.
In the case of the ABJM theory, the matrix model representing the partition function allows various ways of exact analysis, with whic the contributions to the partition function in large N expansion were finally determined.
We extend these methods to be applicable to the more general class of superconformal Chern-Simons theory, and obtain the exact la expansion of the partition function of a N=4 superconformal Chern-Simons theory.
This presentation is based on the corraborative works with Sanefumi Moriyama(KMI, Nagoya U.).

21 Tokiro Numasawa

Kyoto University

Entanglement Entropy in String Theory

We study the entanglement entropy in string theory in the simplest setup of dividing the nine dimensional space into two halves. This corresponds to the leading quantum correction to the horizon entropy in string theory on the Rindler space. This entropy is also cal the conical entropy and includes surface term contributions. We first derive a new simple formula of the conical entropy for any free higher spin fields. Then we apply this formula to computations of conical entropy in open and closed superstring. In our analysis of cl string, we study the twisted conical entropy defined by making use of string theory on Melvin backgrounds. This quantity is easier to calculate owing to the folding trick. Our analysis shows that the entanglement entropy in closed superstring is UV finite owing to the string scale cutoff.

22 Sang A Park

Yonsei Univ. KOREA

Frame-independent holographic conserved charges

We propose the modified form of the conventional holographic conserved charges which provides us the frame-independent expressions charges. This form is also preferable to the conventional one since it is independent of the holographic renormalization scheme. We sh the frame and scheme independence through the matching of our holographic expression to the covariant bulk expression of conserve charges. As an explicit example, we consider five-dimensional AdS Kerr black holes and show that our form of holographic conserved charges gives us the identical expressions in the rotating and non-rotating frames.

23 Yuho Sakatani

Seoul National Univ. KOREA

Defect branes as Alice strings

There exist various defect-brane backgrounds in supergravity theories which arise as the low energy limit of string theories. These backgrounds typically have non-trivial monodromies, and if we move a charged probe around the center of a defect, its charge will be changed by the action of the monodromy. During the process, the charge conservation law seems to be violated. To resolve this puzz examined a dynamics of the charge changing process and showed that the missing charge of the probe is transferred to the backgro We have then explicitly constructed the resultant background after the charge transfer process by utilizing dualities. This backgroun the same monodromy as the original defect brane, but has an additional charge which does not have any localized source. In the litera such a charge without localized source is known to appear in the presence of Alice strings. In this poster, we argue that defect b can be regarded as a realization of Alice strings in string theory and discuss the charge transfer process from that perspective.

24 Shotaro Shiba

Kyoto Sangyo University

Microstates of D1-D5(-P) black holes as interacting D-branes

我々はnear extremal black p-branesの熱力学を、重力相互作用するp-braneの集団運動として記述できることを提唱していて、p-soup modelとい る。今回、この方法でnear extremal D1-D5(-P) blackholeの熱力学を議論して、ブラックホールの微視的状態が正しく記述できることを示した。 はp-soup modelがintersecting branesの系をも正しく扱えることを示唆している。また、ブラックホールの微視的状態に関して、従来のCFTの議論 関係にも触れる。

25 Naoki Shimode

Hokkaido University

In search for p-adic structure in the universe

TBA

26 Akihiko Sonoda

Osaka University

Electromagnetic instability in holographic QCD

We calculate a creation rate of a quark antiquark pair in confining large N gauge theories at a strong coupling, by using AdS/CFT correspondence. It is obtained as the imaginary part of the D-brane action with a constant electromagnetic field in holographic QCD s as Sakai-Sugimoto model. The creation rate is found to increase with the magnetic field parallel to the electric field, while it decrease with the magnetic field perpendicular to the electric field.

27 Sotaro Sugishita

Kyoto University

Ramond-Ramond couplings of D-branes

Boundary string field theory (BSFT) states that the action of the open superstring fields is given by the disk partition function. We calculate the partition function with arbitrary (worldsheet supersymmetric) boundary interactions using the localization technique and the general formula for the Ramond-Ramond coupling with arbitrary open superstirng fields which include massive modes on D9-branes D9-antiD9 brane pairs) and that the formula is simply written by Quillen's superconnection. Applying the formula, we also find that an brane creation via condensation of massive mode never happens. This presentation is based on the work with Koji Hashimoto and Seiji Terashima.

28 Yoshiyuki Tatsuta

Waseda University

Three-generations and Yukawa couplings on magnetized orbifolds

Superstring theory is the only known candidate for consistent unified theory including gravitational interactions and has no theoretic inconsistency at present. It is defined in 10D spacetime, and this predicts that there exists extra six dimensions compactified on sor compact space. It is known that the structure of compact six dimensions determines masses and couplings of the 4D effective field (EFT) after dimensional reductions. We study magnetized higher dimensional supersymmetric Yang-Mills theory as the low-energy effect field theory of type IIB superstring theory and assume that extra six dimensions are compactified on a product of toroidal orbifolds, $T^2/Z_2, Z_3, Z_4$ and Z_6. Thanks to magnetic fluxes in such compact spaces, chiral matters, their family structures and hierar Yukawa couplings can appear in the 4D EFT. In such setups, we will discuss the possibility to construct three-generation models, Yuka couplings and mass hierarchies of quarks and leptons in the standard model.

29 Wen Yu Wen

Chung Yuan Christian Univ. TAIWAN

Nonthermal and Quantum Correction to the Hawking Radiation

We discuss different aspects of nonthermal and quantum correction to the Hawking Radiation in various black holes. In particular, we introduce nonthermal correction via tunneling model and constraint charge-mass ratio of emitted charged particle and obtain correctio area spectrum. We also establish relation among quantum correction, remnant phase and entanglement entropy.

30 Masaya Yata

KEK

The conjugate configurations of defect five-branes

Defect NS5-branes, defect KK5-branes and exotic 522-branes are the six-dimensional objects and converted into each other by T-d transformations. Some of these objects can form composite states, for example, the defect (p,q) five-branes are the bound state c defect NS5-branes and q exotic 522-branes. The defect (p,q) five-branes are similar to the (p,q) seven-branes in type IIB theory. In my poster presentation, I introduce a local description of the (p,q) five-branes which was founded by utilizing the SL(2,Z) × SL(2 monodromy with two-torus. In addition, I explain a new hyper Kahler geometry with torsion (HKT) that indicates the composite state o KK5-branes and the coexistent state of a NS5-brane and a KK5-brane in the HKT formalism.

31 Ruidong Zhu

Tokyo University

An Integrable Lattice Model associated with N=2 Gauge Theories

We tried to construct an integrable model in which on every lattice site there exists a Hilbert space structure.