Titles and abstracts of poster session

Asano Yuhma(Kyoto University)
Title: Large-N Reduction for N=2 Chern-Simons Theories and Localization
Abstract: We study reduced matrix models obtained by the dimensional reduction of N=2 quiver Chern-Simons theories on S^3 and show that it contains a theory around a certain multiple fuzzy sphere background equivalent to the original theory on S^3 in the large-N limit. This is regarded as a novel large-N reduction on S^3, which was proposed before. By using the localization technique, we find the large-N equivalence with respect to supersymmetric observables.

Dongmin Gang(Korea Institute for Advanced Study)
Title: Line Operator Index on S1 x S3
Abstract: We derive a general formula of an index for N = 2 superconformal field theories on S1 \times S3 with insertions of BPS Wilson line or 't Hooft line operator at the north pole and their anti-counterpart at the south pole of S3. One-loop and monopole bubbling effects are taken into account in the computation. As examples, we calculate the indices for N = 4 theories and N = 2 SU(2) theory with Nf = 4, and find good agreements between indices of line operators related by S-duality. The holographic correspondence between the fundamental (anti-symmetric) Wilson line operator and the fundamental string (D5 brane) in AdS5\timesS5 is confirmed by the index comparison.

Hamanaka Masashi(Nagoya University)
Title: Noncommutative ADHM Construction Revisited
Abstract: We would like to discuss Atiyah-Drinfeld-Hitchin-Manin (ADHM) construction and group actions (especially torus actions) for noncommutative U(N) instantons. We also comment on origin of instanton number for U(1). This is based on a forthcoming paper, collaboration with Toshio Nakatsu (Setsunan University).

Hanada Masanori(KEK Theory Center)
Title: Large-Nc universality in QCD and QCD-like theories
Abstract: QCD with a finite baryon chemical potential, despite its importance, is not well understood because the standard lattice QCD simulation is not applicable due to the sign problem. Although sign-free QCD-like theories have been studied intensively, relation to QCD with a finite baryon chemical potential was not clear until recently. In this talk we explain the large-Nc equivalences between QCD and various QCD-like theories, which lead us to a unified viewpoint for QCD with baryon and isospin chemical potentials, SO(2Nc) and Sp(2Nc) gauge theories. In particular two-flavor QCD with the baryon chemical potential is equivalent to its phase quenched version in a certain parameter region, which is relevant for heavy ion collision experiments.
ref) Cherman, M.H. and Robles-Llana, Phys.Rev.Lett. 106 (2011) 091603
M.H. and Yamamoto, arXiv:1103.5480 [hep-ph] (to appear in JHEP)
M.H., Hoyos, Karch and Yaffe, arXiv:1201.3718 [hep-th] (submitted to JHEP)

Hayashi Hirotaka(Korea Institute for Advanced Study)
Title: F-theory fluxes, Chirality and Chern-Simons theories
Abstract: We study the charged chiral matter spectrum of four-dimensional F-theory compactifications on elliptically fibered Calabi-Yau fourfolds by using the dual M-theory description. We argue that the net number of chiral matter fields of the four-dimensional effective theory can be inferred from three-dimensional Chern-Simons couplings generated by four-form fluxes in M-theory. We also develop the method to compute the chirality of the F-theory compactifications by using the intersection numbers and the cones of effective curves of the resolved fourfolds.

Hikida Yasuaki(Keio University)
Title: Higher spin AdS_3 supergravity and its dual CFT
Abstract: Gravity theory is a gauge theory of spin 2 field, and it is possible to construct gauge theories of higher spin fields on AdS space. Recently, Gaberdiel and Gopakumar conjectured that a large N minimal model is dual to a bosonic subsector of a higher spin supergravity on 3d AdS space. Here we propose a supersymmetric version of it, where N=2 CP_N Kazama-Suzuki model is dual to the full higher spin supergravity. We give evidences which support our conjecture. [Ref. JHEP1202(2012)109]

Honda Masazumi(SOKENDAI & KEK)
Title: Numerical studies of the ABJM theory for arbitrary N
Abstract: We show that the ABJM theory, which is a N=6 superconformal U(N)*U(N) Chern-Simons gauge theory, can be studied at arbitrary N and at arbitrary coupling constant by applying a simple Monte Carlo method to the matrix model that can be derived from the theory by using the localization technique. This opens up the possibility of probing the quantum aspects of M-theory and testing the AdS_4/CFT_3 duality at the quantum level. Here we calculate the free energy, and find that the previously proposed analytical formula needs to be corrected by an additional term at each order of the string coupling expansion. The method can be easily generalized to the calculations of BPS operators and to other theories that reduce to matrix models.

Inatomi Shoko(Nara Women's University)
Title: One-Loop Vacuum Energy at the Tachyon Vacuum
Abstract: We consider one-loop vacuum energy at the tachyon vacuum in cubic bosonic open string field theory. The BRST operator Q' in the theory around an identity-based solution is believed to represent a kinetic operator at the tachyon vacuum. Using homotopy operators for Q', we find that one-loop vacuum energy at the tachyon vacuum is independent of moduli such as interbrane distances. This result can be interpreted as support for the annihilation of D-branes at the tachyon vacuum even in the quantum theory.

Irie Hirotaka(National Center for Theoretical Sciences)
Title: Stokes Phenomena and Quantum Integrability in Non-critical String/M Theory
Abstract: Non-critical string/M theory is a solvable model which has been studied to reveal various non-perturbative aspects of string theory with providing new key concepts to the next developments of string theory. Here we show some recent progress in study of Stokes phenomenon in non-critical string theory of the multi-cut two-matrix models. In particular, we argue that it is Stokes phenomenon which allows us to know concepts of non-perturbative completion with analytic study of string-theory landscape from the first principle. [1109.2598, 1011.5745, 1003.1626, 0909.1197, 0902.1676]

Ishii Takaaki(Seoul National University)
Title: Long-distance properties of baryons in the Sakai-Sugimoto model
Abstract: I talk on long-distance properties of baryons in the Sakai-Sugimoto model. In this theory, baryons appear as solitons, but some approximations and/or assumptions have been employed in previous studies. With these approximations, it has been observed that one does not reproduce some model-independent predictions for the behavior of baryon electromagnetic form factors connected with long-range pion physics in large-N QCD. We reconsider the long-range properties of baryons in the Sakai-Sugimoto model without relying on such approximations, and show that the soliton solution we obtain by solving the equations of motion gives the correct result.

Isono Hiroshi(Tata Institute of Fundamental Research, India)
Title: Holographic Wilsonian Renormalisation Group
Abstract: I talk about our recent works on the holographic Wilsonian renormalisation group (WHRG). First, I present some applications of WHRG to the condensed matter physics. Next, I derive a bulk action in the form of GKP-Witten's AdS/CFT dictionary, based on the Polchinski's exact RG flow equation on the boundary side.

Kawaguchi Io(Department of Physics, Kyoto University)
Title: The classical equivalence of monodromy matrices in squashed sigma model
Abstract:We show the classical equivalence of monodromy matrices in two-dimensional non-linear sigma models with target space three-dimensional squashed spheres. A SU(2) Yangian and a quantum affine SU(2) symmetries are realized in the models. According to the symmetries, the classical dynamics of the models are described by two descriptions. One is 1) the rational description and the other is 2) the trigonometric description. In each description, a Lax pair is constructed and the corresponding monodromy matrix is also constructed. We show that the monodromy matrix in the trigonometric description is gauge-equivalent to those in the rational one with the relation between spectral parameters and the rescalings of the $sl(2)$ generators.

Kawamoto Shoichi(Tunghai University)
Title: Large-N Renormalization Group on Fuzzy Sphere
Abstract: We study the large-N renormalization group, a la Brezin and Zinn-Justin, of scalar field theory on a fuzzy sphere. We start with some details of large-N renormalization carried out by integrating out the highest modes of fuzzy spherical harmonics, and then discuss the renormalization group equation. We also plan to argue a limit to noncommutative planes. This is based on a collaboration with T. Kuroki (Rikkyo Univ.) and D. Tomino (Tunghai Univ.).

Kikuchi Toru(Kyoto University)
Title: probe solution in non-geometric background
Abstract: Non-geometric background is a natural and inevitable extension of Riemannian geometry in the string theory. On usual Riemannian geometry, fields are determined up to diffeomorphism and gauge transformation, while on non-geometric backgrounds fields are determined also up to stringy duality transformations, such as T- and S-duality transformations. Recently, a brane called 5_2^2 was found to be a simple example of these non-geometric backgrounds. We study this rather strange background by investigating the behavior of a probe fundamental string solution. We obtain an explicit fundamental string solution rotating around a 5_2^2-brane. This string solution receives successive and discrete T-duality transformations when going around the brane, reflecting the nature of non-geometry. This work is based on collaboration with Takashi Okada and Yuho Sakatani.

Kim Sang-Woo(Osaka University)
Title: Classical solutions in the Lorentzian matrix model for superstring theory
Abstract: Recent Monte Carlo study on the Lorentzian matrix model for superstring theory revealed that an expanding (3+1)-dimensional universe appears dynamically from (9+1)-dimensions after some critical time [1]. The mechanism for the spontaneous breaking of rotational symmetry relies crucially on the noncommutative nature of the three expanding spaces. Here, as a complementary approach to possible future beyond the numerical result, we discuss various classical solutions for the Lorentzian matrix model and their properties.

Kitamoto Hiroyuki(KEK)
Title: Soft Gravitons Screen Couplings in de Sitter Space
Abstract: The scale invariance of the quantum fluctuations in de Sitter space leads to the appearance of de Sitter symmetry breaking infra-red logarithms in the graviton propagator. We investigate physical effects of soft gravitons on the local dynamics of matter fields well inside the cosmological horizon. We show that the IR logarithms do not spoil Lorentz invariance in scalar and Dirac field theory. The leading IR logarithms can be absorbed by a time dependent wave function renormalization factor in the both cases. In the interacting field theory with $\lambda \phi^4$ and Yukawa interaction, we find that the couplings become time dependent with definite scaling exponents. We argue that the relative scaling exponents of the couplings are gauge invariant and physical as we can use the evolution of a coupling as a physical time.

Koh Eunkyung(KIAS)
Title: Domain Wall Index on S1 x S3
Abstract: We consider a superconformal index with S-duality domain wall in 4d N=4 theory [1], which generalizes the line operator index studied in [2]. Firstly, we use the results in [3,4] to define the domain wall index. Then, we give an argument that the domain wall index should be same with the index for the theory "without" the wall. It leads to a non-trivial relation between 3d index for the theory living on the domain wall and 4d 'half-index' of N=4 theory. We show that the relation holds for a few simple examples.

Komatsu Shota(University of Tokyo)
Title: Three point function of GKP string from integrability
Abstract: Adapting the powerful integrability-based formalism invented previously for the calculation of gluon scattering amplitudes at strong coupling, we develop a method for computing the holographic three point functions for the large spin limit of Gubser-Klebanov-Polyakov (GKP) strings, which correspond to twist 2 operators of N-4 super Yang Mills.

Nagasaki Koichi(Osaka University)
Title: D3/D5 brane system and holographic interface CFT
Abstract: In Interface CFT introduced from D3/D5 system, we calculated one-point function of chiral primary operator. On the other hand, according to AdS/CFT correspondence, this system is thought to correspond to type IIB string theory on AdS_5 x S^5 background including a D5 brane as a probe.Therefore we calculated one-point function in this gravity theory and compared these results. As a result we found a non-trivial agreement.

Nakamura Shin(Department of physics, Kyoto University)
Title: Nonequilibrium Phase Transitions and Critical Phenomena from AdS/CFT
Abstract: We make a prediction on new non-equilibrium phase transitions and non-equilibrium critical point, by using AdS/CFT. A gauge-theory plasma is out of equilibrium if a current along the electric field exists. We find new phase transitions and critical phenomena that occur only in the non-equilibrium plasma. There is much chance of finding the same non-equilibrium critical phenomena in real materials, if the idea of the universality applies: our result can be a prediction of string theory on real world. The reference will appear in arXiv in March.

OkazakiTadashi(Osaka University)
Title: Evidence for Duality of Conifold from Fundamental String
Abstract: We study the spectrum of BPS D5-D3-F1 states in type IIB theory, which are proposed to be dual to D4-D2-D0 states on the resolved conifold in type IIA theory. We find BPS partition functions of IIB side completely agree with those of type IIA side by using KS wall-crossing formula. Our result is strong evidence for string dualities on the conifold.

Sakatani Yuho(Department of Physics, Kyoto University)
Title: Relativistic viscoelastic fluid mechanics
Abstract: TBA

Sato Yuki(Nagoya/NBI)
Title: New Multicritical Matrix Models
Abstract: We define new multicritical matrix models introducing the string coupling constant. We show that especially a second multicritical point characterized by the zero string coupling constant corresponds to the continuum limit of the dimer model coupled to the 2-dimensional causal dynamical triangulation. This talk is based on arXiv:1202.4435.

Shiba Shotaro(KEK)
Title: 3-point functions of A(N-1) Toda theory and AGT-Wrelation for SU(N) quiver
Abstract: AGT-W relation reveals the nontrivial relation between 4-dim N=2 SU(N) supersymmetric quiver gauge theory and 2-dim A(N-1) Toda field theory, that is, the correspondence between the partition function of the former theory and the correlation function of the latter theory. In this talk, we study on the property of 3-point correlation function of Toda field theory, and discuss the parameter correspondence in AGT-W relation for all cases of SU(N) quiver gauge group.

Shimizu Masahide(Hokkaido University)
Title: Open mirror symmetry for compact Calabi-Yau manifold
Abstract: TBA

Suzuki Ryo(ITF, Utrecht University)
Title: An NLIE method for the spectral problem of AdS_5xS5
Abstract: The excited state spectrum of AdS_5 x S^5 string is computed by the mirror TBA equations. I discuss an equivalent, smaller set of equations called hybrid nonlinear integral equations (NLIE). The hybrid NLIE is written by new dynamical degrees of freedom, analogous to spinon variables in condensed matter systems. This derivation is applicable to any integrable systems which obey A_1 T-system equipped with certain analyticity conditions. A case study of orbifold Konishi state shows that the new method relieves the problem of criticality in the mirror TBA equations.

Tanaka Akinori(Osaka University)
Title: Localization and knots
Abstract: It is well known that the 1/2 BPS Wilson loop of N=2 vector multiplet on three sphere is exactly calculable by using localization techniques. We study the 1/2 BPS condition on squashed three sphere, and find that the loop becomes torus knot or unknot. The expectation values completely match with level k-N Jones-Witten invariants.

Tomino Dan(Tunghai University)
Title: Probing high energy property of string scattering by effective field theory
Abstract: Some years ago, appearance of infinity many linear relations among string scattering amplitudes in high energy limit was found in bosonic open string theory. This phenomenon was speculated as an evidence of some hidden symmetry which is broken in low energy.

Ugajin Tomonori(IPMU)
Title: Soliton Stars as Holographic Confined Fermi Liquids
Abstract: We study a holographic dual of a confined fermi liquid state by putting a charged fluid of fermions in the AdS soliton geometry. This can be regarded as a confined analogue of electron stars. Depending on the parameters such as the mass and charge of the bulk fermion field, we found three different phase structures when we change the values of total charge density at zero temperature. We also analyze the probe fermion equations in the background of this soliton star geometry to confirm the presence of many fermi-surfaces in the system.

Wen Wen-Yu(Chung Yuan Christian University)
Title: Dipole Coupling Effect of Holographic Fermion in Charged Dilatonic Gravity
Abstract: In this note, we study the dipole coupling effect of holographic fermion in a charged dilatonic black hole proposed by Gubser and Rocha. It is found that the property of Fermi liquid is rigid under perturbation of dipole coupling, and the Fermi momentum is linearly shifted. A gap forms as the coupling becomes large enough and this gravity model describes a system in Mott insulator phase.

Yagi Futoshi(SISSA / INFN,Trieste)
Title: M5-branes, toric diagrams and gauge theory duality
Abstract: We explore the duality between five-dimensional N=1 SU(N)^{M-1} and SU(M)^{N-1} linear quiver gauge theories compactified on S^1, which are the five-dimensional uplifts of four-dimensional superconformal linear quivers. We find a correspondence between the gauge theory parameters of the two dual theories, under which identical infrared effective coupling constants are obtained at the Coulomb branch. We show that approaches from M-theory and from the topological string theory give the consistent results.

Yata Masaya(The Graduate University for Advanced Studies)
Title: Chiral Zeromodes on Vortex-type Intersecting Heterotic Five-branes
Abstract: We solve the gaugino Dirac equation on a smeared intersecting five-brane solution in E8 X E8 heterotic string theory to search for localized chiral zeromodes on the intersection. The background is chosen to depend on the full two-dimensional overall transverse coordinates to the branes. Under some appropriate boundary conditions, we compute the complete spectrum of zeromodes to find that, among infinite towers of Fourier modes, there exist only three localized normalizable zeromodes, one of which has opposite chirality to the other two.

Yokokura Yuki(Kyoto University)
Title: Spacetime structure of the Black hole evaporation
Abstract: A model of evaporating black hole is proposed. We consider the evaporation of the black hole including the effect of the back reaction. Focusing on the near horizon, we construct the self-consistent solution of the semi-classical Einstein equation by showing that the Hawking radiation occurs even if the geometry has no horizon, and that the Weyl anomaly is canceled if the effect of gravitons is taken into account. We also take into account the gray-body factor. Our geometry has neither horizon nor singularity, so no information is lost by the black hole evaporation. We construct the geometry of the stationary black hole in thermal bath, and derive the entropy area law from the interior of the horizon.

Yokoyama Daisuke(Tokyo Institute of Technology)
Title: N=2 supersymmetric theories on squashed three-sphere
Abstract: We investigate a squashing deformation of 3d N=2 supersymmetric theories on three-sphere, which have four supercharges. The deformation usually breaks the supersymmetry completely. We explain the way how we can preserve the supersymmetry and construct a deformed theory, which preserves four supercharges. We show the partition function and non-trivial dependence on the squashing parameter. We also consider the large N limit of a certain class of quiver gauge theories which have free energy of order N^(3/2), and show that the free energy on the squashed sphere differs from that on round sphere by a certain factor depending only on the squashing parameter.