Schedule

Events for: Monday, April 18th - Friday, April 22nd

Monday, April 18th

10:00am Sara Pasquetti - SCGP 102

Speaker: Sara Pasquetti

Title: Kernel functions, duality walls and mirror symmetries

Abstract:

11:00am Break - Simons Center Cafe

11:30am Martin Hallnas - SCGP 102

Speaker: Martin Hallnas

Title: A Lassalle-Nekrasov correspondence between rational and trigonometric deformed Calogero-Moser-Sutherland systems

Abstract:

12:30pm Lunch - Simons Center Cafe

2:30pm Abhijit Gadde - SCGP 102

Speaker: Abhijit Gadde

Title: Modularity of supersymmetric partition functions

Abstract: n this talk, I will present a novel modular property of 4d N=1 supersymmetric partition functions of supersymmetric theories with R-symmetry. It is a generalization of the modularinvariance of the supersymmetric partition function of two-dimensional supersymmetric theories on a torus i.e. of the elliptic genus. It comes from requiring consistency of partition functions under gluing and, among other things, can be used to rederive the supersymmetric Cardy formula for four-dimensional gauge theories that has played a key role in computing the entropy of supersymmetric black holes.

3:30pm Break - Simons Center Cafe

4:00pm Tadashi Okazaki - SCGP 102

Speaker: Tadashi Okazaki

Title: M2-branes and plane partitions

Abstract: There is a correspondence between the protected local operators in the 3d SCFTs describing the geometry $\mbox{mathb}{C}^2$ probed by a stack of N M2-branes and plane partitions of trace N. We discuss combinatorial expressions of the indices which count the local operators parametrizing $\mbox{mathb}{C}^2/\mbox{mathb}{Z}_k$ probed by N M2-branes in the canonical and grand canonical ensembles in terms of generating functions for plane partitions. If time permits, we also discuss the asymptotic behaviors of the grand potential in the high-temperature limit and the scaling dimension in the large N limit.

Tuesday, April 19th

10:00am Hjalmar Rosengren - SCGP 102

Speaker: Hjalmar Rosengren

Title: Deformed Ruijsenaars operators and elliptic hypergeometric functions

Abstract: The Ruijsenaars operators are a commuting family of difference operators with elliptic coefficients, which define an integrable system of relativistic quantum particles. Through the work of Chalykh, Feigin, Silantyev, Veselov and others, it has become apparent that even more general "deformed" or "super" operators exist. We will describe how to obtain the main properties of such operators in a direct way, which works also in the elliptic setting. In particular, we can prove that the deformed elliptic Ruijsenaars model is integrable, which has until now been an unsolved problem. Our results are intimately related to identities for elliptic hypergeometric series. The talk is based on joint work (Comm. Math. Phys., 2022) with Martin Hallnäs, Edwin Langmann and Masatoshi Noumi.

11:00am Zoom: Sameer Murthy - Zoom

Speaker: Sameer Murthy

Title: TBD

Abstract:

12:00pm Lunch - Simons Center Cafe

1:00pm SCGP Weekly Talk: Masahito Yamazaki - SCGP 102

Speaker: Masahito Yamazaki

Title: Elliptic Hypergeometric Integrals in Mathematics and Physics

Abstract: f the recurring themes in math/physics interactions is that mathematicians and physicists arrive at the same ingredients in completely different paths/motivations. In this colloquium we will see an example of this phenomenon for elliptic-hypergeometric integral identities. In addition to their intrinsic mathematical interest, they also appear in physics as precision checks of dualities in supersymmetric gauge theories. I will explain how this interplay has led me to use the techniques of supersymmetric gauge theories to find new elliptic-hypergeometric-type solutions to the Yang-Baxter equations.

3:30pm Break - Simons Center Cafe

4:00pm Zoom: Jan Felipe van Diejen - Zoom/SCGP 102

Speaker: Jan Felipe van Diejen

Title: Elliptic Ruijsenaars operators and WZW fusion rings

Abstract: The fusion ring for su(n)_m Wess-Zumino-Witten conformal field theories is known to be isomorphic to a factor ring of the ring of symmetric polynomials presented by Schur polynomials. We introduce a deformation of this factor ring associated with eigenpolynomials for the elliptic Ruijsenaars difference operators. The corresponding Littlewood-Richardson coefficients are governed by a Pieri rule stemming from the eigenvalue equation. The orthogonality of the eigenbasis gives rise to an analog of the Verlinde formula. In the trigonometric limit, our construction recovers the refined su(n)_m Wess-Zumino-Witten fusion ring associated with the Macdonald polynomials. This talk is based on joint work with Tamás Görbe, University of Groningen

Wednesday, April 20th

10:00am Nikita Nekrasov - SCGP 102

Speaker: Nikita Nekrasov

Title: Special functions from instanton counting

Abstract:

11:00am Break - Simons Center cafe

11:30am Oleg Chalykh - SCGP 102

Speaker: Oleg Chalykh

Title: TBD

Abstract:

12:30pm Lunch - Simons Center Cafe

1:30pm Physics Seminar: Saebyeok Jeong - SCGP 102

Speaker: Saebyeok Jeong

Title: Exact QFT duals of AdS black holes

Abstract: Recent studies showed that the N=4 superconformal index leads to the microstate counting of the BPS black holes in AdS_5 X S^5. I will explain how we can enhance such an account of the AdS black hole entropy from the saddle point analysis of the matrix model for the N=4 index. Firstly, I will focus on the small black holes whose sizes are much smaller than the AdS radius. The saddle point equation can be solved exactly in this limit. The exact free energy obtained in this way gives a first principle account for the counting of the asymptotically flat black holes. Secondly, motivated by the previous exact solution for the small black holes, I will explain the saddle point equation can in fact be solved without taking any limit. I will show the saddles corresponding to the known BPS black holes arise as 'areal' distributions. The talk is based on https://arxiv.org/abs/2111.10720 with Sunjin Choi, Seok Kim, and Eunwoo Lee;

4:00pm **Fei Yan - SCGP 102**

Speaker: Fei Yan

Title: Line defects in T[M] and Chern-Simons thimbles

Abstract: This talk concerns half-BPS line defects in a class of 3d N=2 theories T[M] associated with three-manifolds M. I will describe a geometric way to compute the line defect index counting interface operators between line defects. I will also mention some connections to 2d (2,2) Chern-Simons Landau-Ginzburg models.

Thursday, April 21st

10:00am Zoom: Vyacheslav Spiridonov - Zoom/SCGP 102

Speaker: Vyacheslav Spiridonov

Title: Integrable Systems and Special Functions

Abstract: I functions can be defined as functions emerging from similarity reductions of integrable equations. I will demonstrate the power of this approach through the history of deriving continuous q-Painleve functions out of the ordinary Schr\"odinger equation and the elliptic hypergeometric function (the simplest superconformal index) out of the recurrence relation for biorthogonal rational functions.

11:00am Break - Simons Center cafe

11:30am Sergei Gukov - SCGP 102

Speaker: Sergei Gukov

Title: Fermionic forms and BPS quivers

Abstract:

12:30pm Lunch - Simons Center Cafe

2:30pm Zoom: Andrew Kels - Zoom/SCGP 102

Speaker: Andrew Kels

Title: Integrable models on lattices and dualities of supersymmetric indices

Abstract: In this talk I will consider two different types of integrable models that live on lattices. The first are the integrable lattice models of statistical mechanics which satisfy a special form of Yang-Baxter equation known as the star-triangle relation, the most famous example of which is the Ising model. The second are the integrable systems of discrete soliton equations which satisfy integrability in terms of a property known as multidimensional consistency. These provide discrete counterparts of integrable differential soliton equations such as the famous Korteweg-de Vries (KdV) equation. Both of these types of integrable models can be derived from dualities of indices of certain supersymmetric gauge theories in some particular limits. The connections to such supersymmetric indices has initially been developed in independent works of Spiridonov and Yamazaki, motivated by integrable models obtained by Bazhanov, Mangazeev, and Sergeev. On the mathematical side these dualities are identities for hypergeometric integrals. In this talk I will provide an overview to these topics mainly from the point of view of integrable models, and present some open problems that might be of interest to mathematicians/physicists working in the area.

3:30pm Break - Simons Center Cafe

4:00pm Sergio Benvenuti - SCGP 102

Speaker: Sergio Benvenuti

Title: Dualities from deconfinement

Abstract: We prove dualities involving four dimensional N=1 gauge theories with rank-2 matter. We assume only elementary dualities, that is Seiberg and Intriligator-Pouliot dualities. The strategy is to use multiple times elementary S-confining dualities and elementary electric-magnetic dualities, until the desired dual theory is reached. As a first example, we derive the Wess-Zumino description of all S-confining single node quivers with rank-2 matter. As a second example, we derive a 'fully deconfined' dual of Usp(2N) with an antisymmetric and 2F fundamental fields, then use it to prove a self-duality valid at F=4. These results are based on ongoing work with Stephane Baejot, and uplift 3d results obtained with Ivan Garozzo and Gabriele Lo Monaco.

Friday, April 22nd

10:00am Maxim Zabzine - SCGP 102

Speaker: Maxim Zabzine

Title: The index of M-theory and equivariant volumes

Abstract: Motivated by M-theory, I will review rank n nn K-theoretic Donaldson-Thomas theory on a toric threefold and its factorisation properties in the context of 5d/7d correspondence. In the context of this discussion I will revise the use of the Duistermaat-Heckman formula for non-compact toric Kahler manifolds, pointing out some mathematical and physical puzzles.

11:00am Break - Simons Center cafe

11:30am Gabi Zafrir - SCGP 102

Speaker: Gabi Zafrir

Title: Compactifying 5d superconformal field theories to 3d

Abstract:

12:30pm Lunch - Simons Center Cafe