International Centre for Theoretical Sciences, India

ICM Satellite Conference

on

Algebraic and Combinatorial Approaches to Representation Theory

August 12-16, 2010

National Institute of Advanced Studies
Bangalore, India

ICTS-ACART (an ICM satellite conference); NIAS, Bangalore, Aug 12-16, 2010

Schedule of Talks: Morning session

	8:00-9:00	9:00-9:40	9:50-10:30	**10:35-10:55**	10:55-11:35	11:45-12:25	**12:35-2:15**
Thursday, Aug 12	**BREAKFAST**	KASHIWARA	ACHAR	**COFFEE**	SAVAGE	OKADO	**LUNCH**
Friday, Aug 13	**BREAKFAST**	PARAMESWARAN	HERNANDEZ	**COFFEE**	JAKELIC	MOURA	**LUNCH**
Saturday, Aug 14	**BREAKFAST**	SUBRAHMANYAM	ADSUL	**COFFEE**	10:55-11:25: KHANDAI 11:35-12:05: GRAHAM	12:15-12:45: DATT	**12:45: LUNCH**
Sunday, August 15	**BREAKFAST**	NEHER	HELMINCK	**COFFEE**	LOKTEV	BAKALOV	**LUNCH**
Monday, August 16	**BREAKFAST**	SCOTT	MATHAS	**COFFEE**	DU	RAGHAVAN	**LUNCH**

All meals (Breakfast, lunch, dinner) will be served at the conference venue (National Institute of Advanced Studies).

ICTS-ACART (an ICM satellite conference); NIAS, Bangalore, Aug 12-16, 2010

Schedule of Talks: Afternoon session

	12:35-2:15	2:15-2:55	3:05-3:45	3:50-4:20	4:20-5:00	6:00-7:15	**7:15-9:00**
Thursday, Aug 12	**LUNCH**	NAKASHIMA	LAUDA	HI-TEA	MIWA		**DINNER**
Friday, Aug 13	**LUNCH**	RAO	LAU	HI-TEA	ADAMOVIC	CONCERT	**CONFERENCE BANQUET**
Saturday, Aug 14	**12:45: LUNCH**	HALF DAY OFF; SIGHTSEEING AND DINNER ON YOUR OWN					
Sunday, August 15	**LUNCH**	GREENSTEIN	FOURIER	HI-TEA	JING		**DINNER**
Monday, August 16	**LUNCH**	FEIGIN	CHENG	HI-TEA	PRASAD	Conference concludes	**Dinner on your own**

All meals (Breakfast, lunch, dinner) will be served at the conference venue (National Institute of Advanced Studies).

Titles and Abstracts of Talks

Thursday August 12, Morning session

Speaker: Masaki Kashiwara
Title: Crystal bases of the quantized queer super-algebra
Abstract: In this talk, I explain the crystal basis theory for a class of finite-dimensional representations of the quantum queer superalgebra. Since the algebra contains a Clifford algebra, we have to adapt the notion of crystal bases to this case, and it is not anymore a "basis" but it still captures a combinatorial structure of the representations. This is a joint work with Dimitar Grantcharov, Ji Hye Jung, Seok-Jin Kang and Myungho Kim.

Speaker: Pramod N. Achar
Title: The enhanced nilpotent cone
Abstract: Let V be a finite-dimensional vector space, and let $\mathcal{N} \subset \mathrm{End}(V)$ denote the variety of nilpotent operators on V. The *enhanced nilpotent cone* is simply the variety $\mathcal{N} \times V$. The geometry of $GL(V)$-orbit closures in $\mathcal{N} \times V$ turns out to have connections to numerous other topics, including Kato's exotic nilpotent cone (and his geometric realization of affine Hecke algebras with unequal parameters), Shoji's Green functions for limit symbols, and the mirabolic character sheaves of Finkelberg-Ginzburg-Travkin. I will explain some results and some open problems about these orbit closures. This is joint work with A. Henderson and B. Jones.

Speaker: Alistair Savage
Title: Hecke algebras and a categorification of the Heisenberg algebra
Abstract: In this talk we will present a categorification of the Heisenberg algebra. We first define a category given by certain planar diagrams whose definition is inspired by induction and restriction functors on modules of Hecke algebras of type A. Our graphical category then acts on the category of such modules in a natural way. The Grothendieck group of our graphical category is the Heisenberg algebra in infinitely many generators and thus we obtain a "categorification" of this algebra. We will see that other algebraic structures, such as a deformation of the degenerate affine Hecke algebra, appear naturally. Furthermore, our category (conjecturally) acts on the category of modules of general linear groups over finite fields. This is joint work in progress with Anthony Licata and inspired by work of Mikhail Khovanov.

Speaker: Masato Okado
Title: X=M for large rank
Abstract: The X=M conjecture claims the equality between the 1-d sum X, generating function of classical highest weight elements of a tensor product of KR crystals with fixed weight, and the fermionic formula M, originating from the counting problem in Bethe Ansatz. It is still open even in the nonexceptional affine types, where the structures of KR crystals are known. However, when the rank is large, we can settle it by showing the relation with type A both in the X and M side. These are joint works with Cédric Lecouvey and Mark Shimozono, and with Reiho Sakamoto.

Thursday August 12, Afternoon session

Speaker: Toshiki Nakashima
Title: Geometric and Unipotent Bicrystals and Polyhedral Realization of Crystal Bases
Abstract: For arbitrary reductive algebraic groups, the notion of unipotent bicrystals and deco-

rated geometric crystals has been introduced by Berenstein and Kazhdan [BK,2007]. They showed that ultra-discretization of these geometric crystals are isomorphic to Kashiwara's crystals for irreducible highest weight modules of quantum algebras. We found polyhedral realization of Kashiwara's crystals for any Kac-Moody algebra[NZ,1997][N,1999], which gives a crystal as a set of integer points of some convex polyhedron in real vector space. We shall present certain relation between the B-K realization and the polyhedral realization in GL_n-case.

Speaker: Aaron Lauda
Title: A categorification of quantum sl(2)
Abstract: Crane and Frenkel conjectured that that the quantum enveloping algebra of sl(2) could be categorified at generic q using its canonical basis. In my talk I will describe a realization of this conjecture using a diagrammatic calculus.

Speaker: Tetsuji Miwa
Title and abstract: TBA

Friday August 13, Morning session

Speaker: A. J. Parameswaran
Title: Holonomy Group Schemes of Smooth Projective Varieties
Abstract: We show that the category of strongly lf-graded vector bundles (equivalantly vector bundles obtained by succssive extensions of strongly stable vector bundles) of degree zero on a smooth projective variety form a neutral Tannaka category. Holonomy Group Scheme is by defenition the affine group scheme defined by this Tannaka category. After quickly outlining the proof, we will discuss some application of this theorem.

Speaker: David Hernandez
Title: Simple tensor products and quantum affine algebras
Abstract: Let F be the category of finite dimensional representations of an arbitrary quantum affine algebra. We prove that a tensor product $S_1 \otimes \cdots \otimes S_N$ of simple objects of F is simple if and only if for any ij, $S_i \otimes S_j$ is simple. We will discuss motivations, applications and the proof of this result.

Speaker: Dijana Jakelic
Title: Tensor products and blocks of finite dimensional representations of quantum affine algebras at roots of unity
Abstract: For generic values of the quantization parameter, results of V. Chari and M. Kashiwara provide a way of obtaining indecomposable objects of the category of finite-dimensional representations of quantum affine algebras by giving sufficient conditions for a tensor product of simple objects to be highest-weight. In particular, a tensor product of fundamental representations can always be reordered in such a way that these conditions are satisfied. Furthermore, this property turned out to be one of the essential ingredients used by P. Etingof and A. Moura (also Chari and Moura) to describe the block decomposition of the category.

In this talk, we will focus on a joint work with Moura where we consider the root of unity setting. We prove an analogue of Chari's version of the aforementioned result on tensor products of simple modules. However, the result about tensor products of fundamental representations is no longer valid. We will discuss the techniques we used to overcome this issue for describing the blocks in the root of unity setting.

Speaker: Adriano Moura
Title: On the Characters of Minimal Affinizations of Quantum Groups
Abstract: Let $\mathfrak{g}$ be a finite-dimensional simple Lie algebra over the field of complex numbers. Consider its loop algebra $\tilde{\mathfrak{g}}$ and the corresponding quantized enveloping algebras $U_q(\mathfrak{g})$ and $U_q(\tilde{\mathfrak{g}})$. We will refer to the latter as the quantum affine algebra of $\mathfrak{g}$. It is known that, unless $\mathfrak{g}$ is of type A, there is no quantum group analogue of the evaluation maps $\tilde{\mathfrak{g}} \to \mathfrak{g}$. In particular, the concept of evaluation representations is not available in the context of quantum affine algebras in general and it turns out that not every representation of $U_q(\mathfrak{g})$ can be extended to one of $U_q(\tilde{\mathfrak{g}})$. To overcome this issue, V. Chari and A. Pressley introduced the concept of minimal affinizations of an irreducible finite-dimensional $U_q(\mathfrak{g})$-module. Roughly speaking, a minimal affinization is a minimal enlargement of the given irreducible representation of $U_q(\mathfrak{g})$ which can be extended to a representation of $U_q(\tilde{\mathfrak{g}})$.

A special class of minimal affinizations is the one of Kirillov-Reshetikhin modules which are the minimal affinizations of the irreducible modules whose highest weights are multiples of the fundamental weights. These modules were originally introduced in the mathematical physics literature before the concept of minimal affinizations was defined. One problem of particular interest regarding minimal affinizations is that of describing their characters. In this talk I will present further developments on the solution to this problem. Namely, we prove that certain minimal affinizations are isomorphic to certain graded modules for the underlying current algebra. This strategy was previously used by Chari and the speaker to prove several character formulas for Kirilov-Reshetikhin modules which had been conjectured in the mathematical physics literature. More recently, the speaker has devised a way of extending this method to minimal affinizations having more general highest weights and obtained some formulas which appear not to have been conjectured before (part of the method had been developed earlier on papers by Chari and Kleber).

Friday August 13, Afternoon session

Speaker: S. Eswara Rao
Title: Representations of Toroidal Lie algebras
Abstract: Let $\mathfrak{g}$ be simple finite dimensional Lie algebra. For a positive integer n define $A = \mathbb{C}[t_1^{\pm 1}, \ldots, t_n^{\pm 1}]$ a Laurent polynomial ring in n commuting variables. Consider $\mathfrak{g} \otimes A$ which is naturally Lie algebra. The universal central extension of $\mathfrak{g} \otimes A$ is called Toroidal Lie algebra which is a natural generalization of Affine Lie algebra. We classify irreducible integrable modules for Toroidal Lie algebras with finite dimensional weight spaces. We also generalize Virasoro Lie-algebra and state some results and conjectures.

Speaker: Michael Lau
Title: Representations of twisted toroidal Lie algebras
Abstract: In the late 1960s, Victor Kac constructed the affine Lie algebras as extensions of fixed point subalgebras of loop algebras. Similarly, almost all extended affine Lie algebras are extensions of fixed point subalgebras of toroidal loop algebras. In this talk, I will describe irreducible representations of these algebras.

Speaker: Drazen Adamovic
Title: On triplet vertex algebras and their representations
Abstract: In this talk we shall present our recent results on the representation theory of certain families of non-rational, C_2 cofinite vertex (super) algebras. These vertex algebras have finitely many irreducible representations, but also admit indecomposable and logarithmic representations. The corresponding Zhu's algebras and C_2 algebras will be described. We shall also discuss the

connection between triplet vertex algebras and quantum groups at root of unity. (This talk is based on joint work with A. Milas).

Saturday August 14, Morning session

Speaker: K Venkata Subrahmanyam
Title: Quantum deformation of the restriction of $GL_{mn}(\mathbb{C})to\ GL_m(\mathbb{C}) \times GL_n(\mathbb{C})$
Abstract: Consider the embedding of $H = GL_m(\mathbb{C}) \times GL_n(\mathbb{C})$ in $GL_{mn}(\mathbb{C})$, via $(A, B) \mapsto A \otimes B$. It is of interest to determine if the multiplicity, $m^{\lambda}_{\mu,\nu}$, of the irreducible H module $V_\mu(GL_m) \otimes V_\nu(GL_n)$ in $V = V_\lambda(GL_{mn})$ is non zero. In joint work with Bharat Adsul and Milind Sohoni we initiate a quantum approach to solve this problem.

In the special case when V is $Sym^d(mn)$ or when V is $\wedge^d(mn)$, the decomposition into H modules is well understood. In fact, Danilov and Koshevoy also give a crystal explanation for the decomposition, in these special cases. We give a quantum explanation to the crystals proposed by Danilov and Koshevoy.

In the special case when $m = n = 2$, we give a conjecturally correct decomposition of the crystal graph of an irreducible $GL(4)$ module, so that it acquires a $GL(2) \times GL(2)$ crystal structure. A quantum explanation of this will be taken up in the talk by Bharat Adsul.

Speaker: Bharat Adsul
Title: $U_q(gl_m) \otimes U_q(gl_n)$-deformations of $GL_{mn}(\mathbb{C})$-modules
Abstract: In this ongoing work, we consider the restriction of finite dimensional $GL_{mn}(\mathbb{C})$-modules to the 'subgroup' $GL_m(\mathbb{C}) \times GL_n(\mathbb{C})$. In particular, for a Weyl module V_λ of $GL_{mn}(\mathbb{C})$, we ask to construct a representation W_λ of $U_q(gl_m) \otimes U_q(gl_n)$ such that at $q = 1$, the restriction of V_λ to $U_1(gl_m) \otimes U_1(gl_n)$ matches its action on W_λ at $q = 1$. Thus W_λ is a q-deformation of the module V_λ.

Our strategy for the construction of W_λ is to first construct it when λ is a single column shape (these are called the wedge modules $\wedge^k$). Next, we develop $U_q(gl_m) \otimes U_q(gl_n)$-equivariant maps $\psi_{a,b} : \wedge^{a+1} \otimes \wedge^{b-1} \to \wedge^a \otimes \wedge^b$. These give rise to the straightenning relations which are to be used as the building blocks to construct the general W_λ.

Speaker: Tanusree Khandai
Title: Weyl Modules for Multiloop Lie Algebras
Abstract: Multiloop Lie Algebras are multi-variable generalizations of the loop algebras that are associated with affine Kac-Moody Lie algebras. The classification of the finite-dimensional irreducible representations of multiloop Lie algebras showed that such representations are highest weight in a suitable sense. The global Weyl modules are universal highest weight integrable modules and the local Weyl modules are universal highest weight finite-dimensional modules for a Lie algebra. In the talk I shall briefly outline the classification of the finite dimensional irreducible representations of the multiloop Lie algbras, define the notion of global and local Weyl modules for the multiloop Lie algebras and after listing some of their properties I shall show that global and local Weyl modules for twisted multiloop Lie algebras can be identified with suitably chosen local and global Weyl modules for the non-twisted multiloop Lie algebras. This talk is based on a joint work with Ghislain Fourier.

Speaker: John Graham
Title: The Centre of the Ariki-Koike Algebra
Abstract: The Ariki-Koike algebra $H(R, q)$ is a quotient of the (extended) affine Hecke algebra

associated to the general linear group. The centre of affine Hecke algebra has a well known description in terms of the Weyl group action on the weight lattice. In the talk, I discuss a proof that (over an arbitrary unital commutative ring R) the centre of the Ariki-Koike algebra is the image of the centre of the affine Hecke algebra if $q-1$ is invertible in R. This is joint work with Andrew Francis and Lenny Jones.

Speaker: M. Sumanth Datt
Title: The ring of twisted tilting modules for quantum groups
Abstract: In our paper [with Stephen Donkin, Some remarks on the ring of twisted tilting modules for algebraic groups, Journal of Algebra 321 (2009) 31283144], we consider the ring of twisted tilting modules for algebraic groups and have shown that this ring is reduced for $Sl_2(k)$, where k is an algebraically closed field of charecteristic $p > 0$. Therefore it is natural to consider this ring for quantum groups. In this talk we give a decomposition of the tensor product of two simple modules for quantum $Gl_2(k)$ and we consider the ring of twisted tilting modules for quantum groups. We show that the ring is reduced for the Quantum $Gl_2(k)$.

There is no afternoon session on Saturday August 14.

Sunday August 15, Morning session

Speaker: Erhard Neher
Title: Finite-dimensional irreducible representations of equivariant map algebras
Abstract: Let X be an affine scheme, $\mathfrak{g}$ a finite-dimensional Lie algebra and suppose a finite group acts on X and on $\mathfrak{g}$ by automorphisms. The corresponding *equivariant map algebra* is the Lie algebra $\mathfrak{M}$ of equivariant regular maps from X to $\mathfrak{g}$.

In this talk I will describe the classification of finite-dimensional irreducible representations of $\mathfrak{M}$ (joint work with Alistair Savage and Prasad Senesi). Our result recovers the known classifications of the irreducible finite-dimensional representations of (multi)loop algebras, current algebras and the Onsager algebra. We also obtain new classifications, for example for generalized Onsager algebras.

Time permitting, I will also describe the extensions between finite-dimensional irreducible representations of equivariant map algebras (joint work in progress with Alistair Savage).

Speaker: Aloysius Helminck
Title: Cartan subspaces
Abstract: Let G be a connected reductive algebraic group defined over a field k of characteristic not 2, σ an involution of G defined over k, H a k-open subgroup of the fixed point group of σ and G_k (resp. H_k) the set of k-rational points of G (resp. H). The variety G_k/H_k is a generalization of a real reductive symmetric spaces to arbitrary fields and is called a symmetric k-variety. For real and p-adic symmetric k-varieties the space $L^2(G_k/H_k)$ of square integrable functions decomposes into several series, one for each H_k-conjugacy class of Cartan subspaces of G_k/H_k. In this talk we will discuss some recent results about the H_k-conjugacy classes of Cartan subspaces. This includes some combinatorial results related to orbit closures.

Speaker: Sergey Loktev
Title: Weyl modules beyond two-variable case
Abstract: Weyl modules are universal finite-dimensional highest weight representations of current Lie algebras. In this talk we discuss what is known and what to expect for currents in three and more variables.

Speaker: Bojko Bakalov
Title: Singularities, root systems, and W-algebras
Abstract: Gromov–Witten invariants are naturally organized in a generating function, which is a formal power series in infinitely many variables. In many cases this function is a highest-weight vector for the Virasoro algebra and at the same time is a solution of an integrable hierarchy of partial differential equations. Similar generating functions can be introduced for the Frobenius structures coming from singularities of hypersurfaces. The generating function of a simple singularity was shown recently to be a solution of the Kac–Wakimoto hierarchy. Our main result is that it is also a highest weight vector for the corresponding W-algebra. Joint work with T. Milanov.

Sunday August 15, Afternoon session

Speaker: Jacob Greenstein
Title: Quantum folding
Abstract: We introduce a quantum analogue of the classical folding of simply-laced Lie algebra $\mathfrak{g}$ to the non-simply-laced algebra $\mathfrak{g}^\sigma$ along a Dynkin diagram automorphism σ of $\mathfrak{g}$. For each quantum folding we replace $\mathfrak{g}^\sigma$ by its Langlands dual $\mathfrak{g}^{\sigma\vee}$ and construct a nilpotent Lie algebra $\mathfrak{n}$ which interpolates between the nilpotnent parts of $\mathfrak{g}$ and $\mathfrak{g}^{\sigma\vee}$, together with its quantized enveloping algebra $U_q(\mathfrak{n})$ and a Poisson structure on $S(\mathfrak{n})$. Remarkably, for the pair $(\mathfrak{g}, \mathfrak{g}^{\sigma\vee}) = (\mathfrak{so}_{2n+2}, \mathfrak{sp}_{2n})$, the algebra $U_q(\mathfrak{n})$ admits an action of the Artin braid group Br_n and contains a new algebra of quantum $n \times n$ matrices with an adjoint action of $U_q(\mathfrak{sl}_n)$, Even for the case of diagonal folding the resulting algebra is quite non-trivial. (joint with A. Berenstein)

Speaker: Ghislain Fourier
Title: Another basis and pattern for irreducible A_n modules
Abstract: There is a natural filtration on the lower part of the universal enveloping algebra of a simple Lie algebra, the degree filtration. It induces the PBW filtration on any irreducible module of this Lie algebra. In this talk, we will give generators and relations for the associated graded module of an irreducible A_n-module with respect to this filtration. As a byproduct we obtain a new class of patterns and bases for irreducible A_n-modules, conjectured by Vinberg (2005), and a graded character formula. The generalization to "C_n" will be also discussed. (joint with E. Feigin, P. Littelmann)

Speaker: Naihuan Jing
Title: Realizations of Classical Toroidal Algebras
Abstract: Classical affine algebras can be realized as bosonic and fermionic fields, similar to known constructions of orthogonal/symplectic Lie algebras used by physicists. We will discuss how to generalize the Feingold-Frenkel construction to toroidal algebras. Moreover new fermionic realizations of toroidal algebras of symplectic types and bosonic realizations of orthogonal types are derived in this generalization. This is joint work with K. Misra and C. Xu.

Monday August 16, Morning session

Speaker: Leonard Scott
Title: New graded methods in representation theory
Abstract: This talk reports on joint work with Brian Parshall. An ungraded finite dimensional algebra A can possess many of the best properties we know from Lie theory, but still fail to have the grading that would be expected if it were a Koszul algebra. It is in general a very hard problem to establish such a grading when the algebra A is not known to have one already, for some external reason. In particular, one confronts the very difficult algebraic problem of establishing an

isomorphism of the algebra A and gr A, the graded algebra obtained by adding up the quotients of successive powers of the radical series of A. In this work we take a new approach, of working with gr A and transferring to it good properties of A without establishing any isomorphism. We show this works in some significant cases involving quotients of quantum groups (e.g., regular blocks of q-Schur algebras and their generalizations), and with more restrictions (including the use of primes for which the Lusztig character formula holds, and using only restricted and smaller weights), quotients of hyperalgebras in positive characteristic. In particular, we are able to show gr A is Koszul and transfer the other known good properties of A (quasi-heredity, parity conditions) to gr A. Additional results and Applications will be discussed as time permits.

Speaker: Andrew Mathas
Title: Cyclotomic quiver Hecke algebras of type A
Abstract: We report on some recent developments in the graded representation theory of the cyclotomic quiver Hecke algebras of type A. The lack of detail in this abstract is due to my not yet deciding exactly which aspects of this emerging theory I will talk about!

Speaker: Jie Du
Title: Representations of Affine Quantum Schur Algebras
Abstract: We establish an isomorphism from the quantum loop algebra $U_{\mathbb{C}}(\widehat{\mathfrak{gl}}_n)$ with a Drinfeld's new presentation to the double Ringel–Hall algebra associated with a cyclic quiver $\triangle(n)$ and an explicit homomorphism from the double Ringel–Hall algebra to an affine quantum Schur algebra $\mathcal{S}_{\triangle}(n,r)_{\mathbb{C}}$, We use them to link polynomial representations of $U_{\mathbb{C}}(\widehat{\mathfrak{gl}}_n)$ with representations of $\mathcal{S}_{\triangle}(n,r)_{\mathbb{C}}$. Thus, using Chari-Pressley's classification of finite dimensional representations of $U_{\mathbb{C}}(\widehat{\mathfrak{sl}}_n)$ and its generalization to irreducible polynomial representations of $U_{\mathbb{C}}(\widehat{\mathfrak{gl}}_n)$ by Frenkel and Mukhin, we are able to classify irreducible representations of $\mathcal{S}_{\triangle}(n,r)_{\mathbb{C}}$ in terms of Drinfeld's polynomials.

On the other hand, using the classification of irreducible representations of the affine Hecke algebra $\mathcal{H}_{\triangle}(r)_{\mathbb{C}}$ associated with an affine symmetric group by Zelevinsky and Rogawski, we obtain another classification of irreducible representations of $\mathcal{S}_{\triangle}(n,r)_{\mathbb{C}}$ for $n \geq r$ and a weak version for $n < r$ in terms of finite sets of segments.

We are able to identify the two classifications when $n > r$.
All algebras under consideration are defined over $\mathbb{C}$ with a parameter which is not a root of unity. This is joint work with Bangming Deng and Qiang Fu.

Speaker: K. N. Raghavan
Title: Kazhdan-Lusztig cells and RSK bases
Abstract: From the combinatorial characterizations of the right, left, and two-sided Kazhdan-Lusztig cells of the symmetric group, we construct 'RSK bases' for certain quotients by two-sided ideals of the group ring and the Hecke algebra. Applications to invariant theory, over various base rings, of the general linear group and representation theory, both ordinary and modular, of the symmetric group will be discussed. This is a report on joint work with Samuel and Subrahmanyam (http://arxiv.org/abs/0902.2842).

Monday August 16, Afternoon session

Speaker: Evgeny Feigin
Title: $\mathbb{G}_a^M$ degeneration of flag varieties
Abstract: Let $\mathcal{F}_\lambda$ be a generalized flag variety of a simple Lie group G embedded into the pro-

jectivization of an irreducible G-module V_λ. We will define a flat degeneration $\mathcal{F}_\lambda^a$, which is a $\mathbb{G}_a^M$ variety. Moreover, there exists a larger group G^a acting on $\mathcal{F}_\lambda^a$, which is a degeneration of the group G. The group G^a contains $\mathbb{G}_a^M$ as a normal subgroup. If G is of type A, then the degenerate flag varieties can be embedded into the product of Grassmanians and thus to the product of projective spaces. We will show that the defining ideal of $\mathcal{F}_\lambda^a$ is generated by the set of degenerate Plücker relations. We will also explain that the coordinate ring of $\mathcal{F}_\lambda^a$ is isomorphic to a direct sum of dual PBW-graded $\mathfrak{g}$-modules. If time permits, we will construct bases in multi-homogeneous components of the coordinate rings, parametrized by the semistandard PBW-tableux, which are analogues of semistandard tableux.

Speaker: Shun-Jen Cheng
Title: Representation theory of classical Lie superalgebras and super duality
Abstract: We explain a connection between the representation theories of Lie algebras and Lie superalgebras of classical types, which we refer to as super duality. This talk is based on joint works with N. Lam and W. Wang.

Speaker: Amritanshu Prasad
Title: Combinatorics of finite abelian groups and the Weil representation
Abstract: Given a finite abelian group A of odd order with Pontryagin dual $\hat{A}$, the Weil representation is a representation of the group of automorphisms of $A \times \hat{A}$ that preserve the standard symplectic form which is realized on $L^2(A)$.

We shall show that this representation is multiplicity-free. When A is a p-group of type λ, we parametrize the irreducible representations by a partially ordered set which depends on λ, but not on p. For each parameter, we compute the dimension of the irreducible representation that it parametrizes and show that it is a polynomial in p.

The main ingredient is a combinatorial theory of orbits in a finite abelian group under the action of its automorphism group. All of this is based on joint work with Kunal Dutta.

Hindustani Music Concert

Dr. Pandith Narasimhalu Wadavati and party.
Clarionet
August 13, 2010, 6pm
JRD Tata Auditorium, NIAS.

Pandit Narasimhulu Wadavati has earned an outstanding reputation for his pioneering contribution to music, having adapted the Clarionet - a Western Classical instrument, to the Hindustani style of music.

Pandit Wadavati was born in 1942 in a small village, Wadavati in Raichur Taluk. His grandfather was a *Shehnai* artiste, his father a *Tabla* player, and his mother a devotional singer. Thus he was born into a musically talented family, where strong foundations were laid. His love for music grew from his early boyhood years. He accepted Sri Matamari Veeranna as his Guru and also continued to practice under the guidance of Sri Venkatappa from whom he learnt to sing.

He learnt Hindustani classical music from the late Pandit Siddarama Jambladinni, a famous vocalist belonging to the Gwalior and Jaipur *Gharanas*. After intensive practice for more than 10 years, he became familiar with the intricacies and was able to give solo recitals.

With a streak of experimentation in him after years of arduous practice, he mastered playing the Clarionet adapting to Hindustani Music. He has perfected the art of producing a series of sounds in such a way that the listener can get a near-vocal impact. He can produce the elongated drawl of the “vilambit” portion of the gharanas in a sonorous manner. His subtle nuance has earned him applause among the music fraternity. Even today he continues to thrill the audience and transport them to raptures with his delightful rendition of “alap”, “bada khayal” and many more.

Alongwith his troupe he has not only performed in India but also in U.K., USA and France and won paeans of admiration from the audience. For a decade now, his passion to spread music has inspired him to set up Music Academy “Swara Sangama Sangeetha Vidyalaya” at Raichur and “Pandit Narasimalu Wadavati Music Academy” at Bangalore.

The International Biographical Centre, Cambridge, U.K. has now listed him in its International Who’s Who in Music. He has directed music for the award winning French Documentary “Hathi”.

List of registered participants in the ICTS-ACART conference, NIAS, Bangalore: Aug 12-16, 2010.

NAME	AFFILIATION
Aaron Lauda	Columbia University, New York
Abhinav Verma	IISc, Bangalore
Adriano Moura	UNICAMP - IMECC, Campinas
AJ Parameswaran	KSOM/TIFR, Calicut
Alexandre Bouayad	CMLS, Ecole Polytechnique
Alistair Savage	University of Ottawa
Aloysius Helminck	NCSU, Raleigh
Amita	IISc, Bangalore
Amritanshu Prasad	IMSc, Chennai
Andrew Mathas	University of Sydney
Anil Kumar CP	IMSc, Chennai
Anupam Kumar Singh	IISER, Pune
Biswajit Ransingh	NIT, Rourkela
Bojko Bakalov	NCSU, Raleigh
David Hernandez	CMLS, Ecole Polytechnique
Dijana Jakelic	UNC, Wilmington
Drazen Adamovic	University of Zagreb
Easwara Rao S.	TIFR, Mumbai
Erhard Neher	University of Ottawa
Evgeny Feigin	Lebedev Physics Institute
Gayathri	University of Madras
Geetha Lakshmi	Periyar University, Salem
Ghislain Fourier	Universitat zu Koln
Ivana Baranovic	University of Zagreb
Jacob Greenstein	UC Riverside
Jie Du	UNSW, Sydney
John Graham	Alinta Energy, Sydney
Jonathan Dunbar	NCSU, Raleigh
Jonathan Fernandes	IISc, Bangalore
Kailash Misra	NCSU, Raleigh
Karimilla Nayeem	RIASM, Chennai
Konstantina Christodoulopoulou	UC Riverside
Krishnaveni	University of Madras
Kunal Dutta	IMSc, Chennai
Lei Zhao	University of Virginia
Leonard Scott	University of Virginia
Malka Schaps	Bar-Ilan University
Masaki Kashiwara	RIMS, Kyoto
Masato Okado	Osaka University
Matthew Bennett	UC Riverside
Michael Lau	University of Windsor
Naihuan Jing	NCSU, Raleigh
Nandakumar Elumalai	RIASM, Chennai
Neela N.	Periyar University, Salem
Ozren Perse	University of Zagreb
Pandurangan	University of Madras
Pramod Achar	Louisiana State University
Prasad Senesi	CUA, Washington DC

Preena Samuel	IMSc, Chennai
Priyadharsini Kandasamy	RIASM, Chennai
Punita Batra	HRI, Allahabad
Raghavan KN	IMSc, Chennai
Rebecca Jayne	NCSU, Raleigh
RJ Dolbin	UC Riverside
Sachin Sharma	IMSc, Chennai
Santhosha Pattanayak	CMI, Chennai
Satoshi Nawata	TIFR, Mumbai
Sergey Loktev	ITEP, Moscow
Shripad M. Garge	IIT, Mumbai
Shun-Jen Cheng	Academia Sinica, Taiwan
Sthanumoorthy N.	RIASM, Chennai
Subhrahmanyam KV	CMI, Chennai
Sumanth Datt	University of Hyderabad
Tanusree Khandai	IMSc, Chennai
Tetsuji Miwa	Kyoto University
Thomas Edlund	Lund University
Toshiki Nakashima	Sophia University
Udhaya kumar	Periyar University, Salem
Uma Maheswaran	Periyar University, Salem
Uma Maheswari A.	University of Madras
Upendra Kulkarni	CMI, Chennai
Verma D.N	TIFR, Mumbai
Vidhya Annamalai	RIASM, Chennai
Viswanath S	IMSc, Chennai
Vyjayanthi Chari	UC Riverside
William Cook	Appalachian State University
Shyamashree Upadhyay	IIT, Mumbai
Manish Patnaik	Harvard University
A. Shet	

Four digits numbers are IISc internal telecom numbers. Prefix 2293 when dialing from outside. Bangalore STD code is 080.

Organizers

Dr. Sankaran Viswanath	9740639251
Dr. K N Raghavan	9481823379
Dr. Upendera Kulkarni	9449637631
Abhinav Verma	9741041289
Amita	9241066086

Emergency Services

Health Centre/Ambulance	2227/ 2234
Snake rescue volunteers	2506
POLICE	100
Traffic/accidents	103
AMBULANCE	102
FIRE FIGHTING SERVICES	101
Central Fire Control room and Ambulance	22971550

Accommodation and Travel

Centenary Visitors House	2500
Green Path	42664777/ 93797 95197
NIAS	22185000/ 22185020
Krishinton Suites	42595959
Air India (Indian Airlines)	1800-180-1407
Bangalore International Airport Limited (BIAL)	23540000
Indigo	1800-180-3838
Jet Airways	39899999
Kingfisher	1800-1800-101
Spice Jet	1800-180-3333
RAILWAYS - General Enquiry	139/131
RAILWAYS - Yeshwanthpur	23377161
RAILWAYS - Malleswaram	23347651
RAILWAYS - Cantonment	135
Karnataka State Road Transport Corporation (KSRTC) Enquiry	22873377

Taxi Services

Aishwarya Tours & Travels	23374826/ 9341218070/
Aum Travels	41490452/ 9845402784
Globus Cars	32976555/ 9845680551
Mack Tours and Travels	23134362/ 9448472342
Marshal Tours & Travels	23594166/ 9886028188
Mukyaprana Travels	65303300/ 9448292907
Om Sri Manjunatha Travels	23566556/ 9880472523
Pushpak Travel Agents	23417464/ 9901992744
Ratnagiri Travels	23341011/ 23481012
Sagar Tours and Travels	23413314/ 9844077670
Unique Travel Agents	23374624/ 9448083324
Varsha Tours and Travels	64546055/ 9980873172

Airport Taxis

Easy Cabs (BIAL)	43434343
Meru (BIAL)	44224422

Travel Agencies

Jaybee Travels	2013/ 23602311/ 23602411
Varsha Tours & Travels	23605838/9448568836

ATMs Near NIAS

Axis bank ATMs

* Anagha No. 4, Devasandra, New Bel Road, Next To Coffee Day, Anjanya Temple Street

* 233, 2nd Main, Sampige Road, Malleswaram

* Ganesh Prasad, No. 31. XI Main, 15 Cross, Malleshwaram, Bengaluru 560003

*88/1/1, HMT Main Road, Gokul 1 State, I Phase, Mathikere, Bengaluru 560054

Canara Bank ATMs

* No. 311/45, 'Shantha Krupa' 59th cross, II block, Rajajinagar, Bhashyam Circle

* #438C, Phase 1, 1st Stage, H.M.T. Main Road, Mathikere, Bangalore -560054.

* H.M.T. Main Road, Mathikere Extension, Mathikere, Bangalore -560054.
Branch Premises, IISc, Bengalore - 12.

SBI ATMs

* Gokul Extn, Mathikere,
301/1089 HMT Main Road, Gokul Ist State, IInd Phase.

* Branch Premises Mathikere Road,
Karmika Kalyan Bhavan, Next to R T O Office, Yeshwantpur Mathikere

* CPRI Campus,
CPRI Campus, New BEL Road.

* New BEL Road,
213, New BEL Road,
Avinash.

* 17TH Cross,
17th Cross Maleswaram, Sampige Road

* Main Gate, IISc

Restaurants in IISc

Nesara
* IISc Campus, Behind JRD Tata Library.
* Phone: 23600715, 22932072

Prakruthi (Vegetarian)
* IISc Campus, Near Tata Book House
* Phone: 22932699

Restaurants in Malleshwaram

Khao (at Rasa)
* #30, 1st Cross, Sampige Road,Malleshwaram.
* Landmark: Near Sampige Theatre
Phone: 42067030, 9741355844, 9845095924
Cuisines: Thai, Chinese

Hejje (at Rasa)
* 1st Cross, Sampige Road, Malleshwaram.
* Phone: NA
Tags: cuisines-of-karnataka
Cuisines: Karnataka

Taco Bell
* Mantri Square Mall, 1, Sampige Road, Malleshwaram, Bangalore
* Landmark: In Mantri Square Mall
Phone: 22667222, 22667223

JP Balimo Food Lounge & Deck Bar
* JP Royal, 218, 5th Floor, 13th Cross, Sampige Road, Malleshwaram, Bangalore
* Landmark: Above Coffee Day
Phone: 42199393, 42199392

Halli Mane (Vegetarian)
* 3RD Cross, Sampige Road, Malleshwaram.
* Phone: 41279754

Food Camp
* #87, 10th Cross Street, 1st Temple Street, Malleshwaram, Bangalore
* Phone: 23562357

Viking Family Bar & Restaurant
* 136, 8th Main Road, 15th Cross, Malleshweram, Bangalore
* Phone: 23467992, 23444411

Shanti Sagar
* 324 JP Point, Sampige Road, Opposite Food

World, Malleshwarm, Bangalore
* Landmark: Opposite Food World, Next to Saibaba Temple
Phone: 23318588

Sonas Kodial (Vegetarian)
* 97, 1 Temple Road, 8th Cross, Malleshwaram.
* Phone: 23449588
Cuisines: Mangalorean.

Chung's
* 88/1, Shub Arcade, 16th Cross, Margosa Road, Malleshwaram, Bangalore
* Landmark: Opposite Blue Dart Courier
Phone: 23369844

The Herb
* The Basil Hotel, #8, Sampige Road, Malleshwaram, Bangalore
* Phone: 23315123, 23464353

The Basil Hotel
* Sampige Road, Malleshwaram, Bangalore
* Landmark: Next to Sampige Theatre
Phone: 23315123

Pizza Corner
* 504, Sampige Road, 14th Cross, Malleshwaram.
* Phone: 44112233, 41279605

Kaati Zone Malleswaram
* 8th Main near 19th Cross, Malleshwaram.
* Landmark: Near adjacent to BPCL petrol station
Phone: 41122100

Dhruva Sagar
* 119/1, 11th Cross, Near Vldya Mandir School, Below Bsnl Office, Malleshwaram, Bangalore
* Phone: 23563469

Villa Pottipati
* 142, 8th Cross, 4th Main Road, Malleshwaram.
* Landmark: Near Bangalore Educational Society School
Phone: 23360777, 41280832, 41280833

BonSouth
* Mantri Square 3rd floor Palette, T39, No 1 Sampige Road, Malleshwaram, Bangalore
* Landmark: In Mantri Mall
Phone: 22667377, 43504350

Pizza Hut
* Gr. Floor, 32, Anjan Complex, 2nd Main Road, Vyalikaval, Bangalore
* Phone: 39883988, 23312752

Chef's Bank
* Krishinton Suiets, 993, M.S. Ramaiah Main Road, Yeshwantpur, Mathikere, Bangalore
*Landmark: Near IISC D - Gate

Restaurants near New BEL Road

Shanti Sagar Fast Food
* 34/a, New BEL Road, Bangalore
* Phone: 23604601

Nandhini Palace
* Dollar Colony, New BEL Road, Bangalore
* Phone: 23603322

Pizza Hut
* Gr Floor, Jalaram Colony, P&T Colony, RT Nagar, Bangalore
* Phone: 23435999

Aryashree
* 3, RT Nagar Main Road, Opp. Post Office, RT Nagar, Bangalore
* Phone: 23545488

Hunan
* No. 10, 1st Flr, Near Mayuri Restaurant, New BEL Road, Bangalore
* Landmark: Above Reliance Fresh
Phone: 9739120000
Cuisines: Asian, Thai, Chinese

Mast Kalandar (Vegetarian)
* 7A, 1st Floor, 2nd Cross, New BEL Road.
* Landmark: Opposite Kanti Sweets & HP Petrol Pump
Phone: 42107373, 9980564362
Cuisines: Punjabi

Chungs Kitchen
* Opp. M.S.Ramaiah Hospital, New BEL Road.
* Landmark: Above Cafe Coffee Day

Phone: 23413814, 65675955

Punjabi Rasoi
* No.30, BDA Shopping Complex, RT Nagar.
* Landmark: Near BDA Complex
Phone: 23339171, 23338064

Nandhini Deluxe
* #9, Jaikar Complex, RMV 2nd stage, Near M.S.Ramaiah Hospital, New BEL Road.
* Landmark: Next to Reebok Showroom
Phone: 23519188, 23519199, 23519177

Domino's Pizza
* Ground Floor, Old No. 14/529, New No. 14 , New BEL Road, Bangalore
* Landmark: Near Ramiaha Hospital
Phone: 23512731, 23512734, 23512761

Jashn
* Le Meridian, Sankey Road, Highgrounds
* Phone: 22262233, 22282828

Beijing Bytes
* Indira House #14, 1st floor, ITI Layout, New BEL Road, Bangalore
* Landmark: Opposite Nandhini Palace
Phone: 08023417888, 08023417188

Restaurants in other parts of Bangalore

P!ng - Restaurant & Dessert Bay
* No 130, 1st Cross, 5th Block, Koramangala
* Landmark: Behind Sukh Sagar
Phone: 41521773

Umerkot
* No. 30, 80 Ft Road, 4th Block, Koramangala.
* Landmark: Near Raheja Residency
Apartments, Fitness One, More Supermarket
Phone: 25500426

The Egg Factory
* Ground Floor, White House, St. Marks Road.
* Landmark: Behind Dewar's Wine Store
Phone: 42110041

Herbs & Spice
* 80 Feet Road, Above Planet M & Kaati Zone, Indiranagar, Bangalore
* Landmark: Opposite Kaya Skin Clinic
Phone: 25290399

Samarkand
* Gem Plaza, 66, Infantry Road, Bangalore
* Phone: 41113364

Shiro
* 2nd Floor, UB City Mall, Vittal Mallya Road
* Phone: 41738864

Benjarong
* 1/3 Ulsoor Road, Ulsoor, Bangalore
* Landmark: Near Talwalkars Gym
Phone: 42066166

Vidhyarthi Bhavan
* 32, Gandhi Bazaar, Near Gandhi Bazaar Circle, Basavanagudi, Bangalore
* Phone: 26677588

Khansama
* UB City, 2nd Floor, Vittal Mallya Road.
* Landmark: Near UB City Mall
Phone: 41114466, 41114499

Caperberry Restaurant and Tapas Lounge
* 48/1 Ground Floor, The Estate, No 121, Dickenson Road, Bangalore
* Landmark: Near Next to Manipal Center
Phone: 25594567, 9845177162

Bangalore Bistro
* 74 Brigade Road, Brigade Road, Bangalore
* Phone: 41131616, 25571616

Rakabdar
* 7, Bhuvanappa Layout, Christ College Road, Hosur Road, Koramangala, Bangalore
* Landmark: Opp Forum Mall
Phone: 43431111, 43431100

Woodstok (Resto - Cafe)
* #3777, Domlur Service Road, HAL 2nd Stage, Indiranagar, Bangalore
* Landmark: Near FirePro
Phone: 42115042, 9686191997, 9686191998

The Only Place
* Museum Road, Bangalore
* Landmark: Behind Museum Road Post Office
Phone: 32718989

Pubs & Bars

Oval Bar
* 3rd Floor, Mantri Square Mall, Sampige Road, Malleshwaram, Bangalore
* Landmark: In Mantri Square Mall
Phone: 31901122

P Balimo Food Lounge & Deck Bar
* JP Royal, 218, 5th Floor, 13th Cross, Sampige Road, Malleshwaram.
* Landmark: Above Coffee Day
Phone: 42199393, 42199392

Via Milano
* Asha Plaza, 80 ft Road - 100 ft Road junction, Koramangala, Bangalore
* Landmark: Next to Sony World Crossing
Phone: 41309997, 41309994

Millers Forty Six
* 46 Millers Road, Vasanthnagar, Bangalore
* Landmark: Near ICICI One Source
Phone: 41148022, 41131746, 41131740

Olive Beach
* 16 Wood Street, Ashoknagar, Bangalore
* Phone: 41128400, 41239483

Ebony
* 13th Floor, Barton Center, 84 MG Road, MG Road, Bangalore
* Landmark: near Deccan Herald office
Phone: 25589333, 51783344, 25588697

Road Trip
* 3524/1, Park-Service Road, 1st Main Domlur, Indiranagar, Bangalore
* Landmark: Opposite Subway
Phone: 41155848

Magnolia
* No.37, 8o Feet Road, 7th Cross 3rd Block, Above Reliance Fresh, Koramangala
* Landmark: Near Wipro Park
Phone: 41102222

Indijoe
* 1, Carlton Towers, Madras Road, Airport Road, Bangalore
* Phone: 41113636

100 Ft
* 777/1, HAL 2nd Stage, Diagonally Opp. to New Horizon School, 100 Feet Road, Indiranagar, Bangalore
* Landmark: Near New Horizon School
Phone: 25277752, 25278616

A Taste Of Rampur
* 24, 1st Floor, 5th Block, Koramangala Industrial Layout, Koramangala.
* Phone: 41467000, 9880126499

Sunny's
* 34, Embassy Diamante, Vittal Mallya Road.
* Phone: 41329391, 41329391, 22243642

Aromas Of China
* 19, Shivshankar Plaza, Richmond Circle, Richmond Road, Richmond Town.
* Phone: 41113355

Sahib Sindh Sultan
* Level 2, Forum Mall, Hosur Road, Koramangala, Bangalore
* Phone: 22067878

The Beach
* 1211, 100 Feet Road, HAL II Stage, Indiranagar, Bangalore
* Phone: 41261114

Hard Rock Cafe
* 40 St. Marks Road, Next to Koshy's Jewel Box, St. Marks Road, Bangalore
* Landmark: Next to Koshy's Jewel Box
Phone: 41242222

Harima
* 131, 4th Floor, Devatha Plaza, Residency Road, Bangalore
* Phone: 41325757, 65688222

Windsor Pub
* Kodava Samaja Building, No. 7, 1st Main Road, Vasanthnagar, Bangalore
* Phone: 22258847, 41148006

Serengeti
* Ohri's, Level 3 The Total Mall, Madivala, Koramangala, Bangalore
* Landmark: Opposite Madivala Police Station
Phone: 40003333, 9731558305, 9731558300

SCHEMATIC MAP

(Not to scale)