TITLES AND ABSTRACTS

From the CTQM Nielsen Retreat:
“Algebraic, Geometric, Topological and Quantum Aspects of Moduli Spaces”
At the Sandbjerg Estate, 30 Nov. – 2 Dec., 2006.

Robert Penner:

“String Field Theory of a Point”

Rasmus Villemoes:

"Optimal Metrics on 4-Manifolds"

Magnus Roed Lauridsen:

“Generalized Complex Structures”

Marcel Bökstedt:

“Morse Theory on the Free Loop Space of Complex Projective Space”

Vladimir Fock:

“Explicit (Cluster) Coordinates on Stokes Data and Poisson-Lie Groups”

Abstract: We are going to describe the Stokes data - moduli of holomorphic Connections on a punctured disk with pole of order k at the puncture. We provide them with explicit coordinate description and show that for $k=2$ this space has a Poisson-Lie group structure.

Cristina Martínez:

“On the Cohomology of Brill-Noether Loci over Quot Schemes”

Abstract: Let C be a smooth complex projective curve. The theory of Brill-Noether over the moduli spaces of stable vector bundles or semistable vector bundles over C has been studied intensively. Whenever we have a linear system defined over a curve, it makes sense to consider the Brill-Noether loci by imposing certain number of sections to be independent. The main object of Brill-Noether theory is the study of these subschemes, in particular questions related to their non-emptiness, connectedness, irreducibility, dimension, topological and geometric structure. We will consider Brill-Noether loci over the moduli of maps from C to a Grassmannian G(m,n) of m-planes in C^{n} and the corresponding Quot schemes of quotients of a trivial bundle on C compactifying the spaces of maps. We will study in detail the case in which m=2, n=4, because in this case this theory is related with the geometry of ruled surfaces in the projective space. We will prove results on the irreducibility and dimension of these Brill-Noether loci and we address explicit formulas for their cohomology classes. We will study the existence problem of these spaces which is closely related with the problem of classification of vector bundles over curves.

Peter Tingley:

“A Definition of the Crystal Commutor using Kashiwara Involution”

Abstract: Let **g** be a reductive Lie algebra. For any two crystals A and B of **g** representations, $A \otimes B$ and $B \otimes A$ are isomorphic, but not by the obvious map $a \otimes b \to b \otimes a$. In a previous work, Henriques and Kamnitzer construct a natural isomorphism $\sigma_{A,B} : A \otimes B \to B \otimes A$, called the

commutor, which has many nice properties. Their definition uses Schutzenberger involution, and in particular is only defined for **g** of finite type. In this work, we give a new definition of the commutor. This version relies on Kashiwara involution, and is defined for any symmetrizable Kac-Moody algebra.
In this talk, I will explain the idea behind crystals, without going into any technicalities. I will then go over the two definitions of σ, using the case of sl_3 as an example. As time permits, I will explain the tools we use to show the definitions agree when **g** is of finite type. There will be lots of pictures.

Niels Leth Gammelgaard:

"Discrete Analytic Functions"

Aasa Feragen:

"Equivariant Extension Theory and Homotopy"

Ben Webster:

"Computation in Khovanov-Rozansky Homology II"

Nadya Shirokova:

"On Classification of Floer-Type Theories"

Abstract: Many Floer-type theories can be considered as categorifications of classical invariants. We propose a program of classification of such theories. We construct Floer-type local systems on the spaces of manifolds (including singular ones), extend them to the singular locus and introduce the definition of a local system of finite type. Our main examples come from Khovanov and Ozsvath-Szabo theories.

Dorin Cheptea:

"Lagrangian Cobordisms and the LMO Invariant"

Anatol Kirillov:

"On some Quadratic Algebras, Dunkl Elements, Quantum Cohomology and Beyond"

Abstract: I will introduce several quadratic algebras, namely, classical Yang-Baxter, 6-term relations, 4-term relations and 3-term relations algebras (and their dynamical versions in part Beyond). The main objective of my talk is to define a certain distin-guished set of pairwise commuting elements in each algebra mentioned, the so-called Dunkl and RSM, and Jucys-Murphy elements, and to study commutative subalgebras they generate. I will define Calogero-Moser and Bruhat representations of the 3-term relations algebra and explain that a commutative subalgebra generated by Dunkl elements (resp. RSM elements) in the 3-term relations algebra is isomorphic to the cohomology ring (resp. K-theory) of the corresponding flag variety of type A. A simple deformation of the defining relations of the 3 term relations algebra enables to obtain a similar description for the quantum cohomology and quantum K-theory of flag varieties. "Dynamical" extension of the 3-term relations algebra allows to describe equivariant versions of the results mentioned above. In part Beyond some connections with the (affine) Arin braid and (affine) virtual braid groups, quasitriangular Yang-Baxter and Yang-Baxter groups will be mentioned.