ALGEBRA, DEFORMATIONS AND QUANTUM GROUPS

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Abstracts

Said Aissaoui, University of Béjaia (Algeria)
On classification of finite-dimensional superbialgebras and Hopf superalgebras.
In this talk, we discuss properties of n-dimensional superbialgebras and provide a classification of non-trivial superbialgebras in dimension 2, 3 and 4. Moreover we derive a classification of Hopf superalgebras for these dimension. Our study is deeply related to classification of 4-dimensional algebra du to Armour , Chen and Zhang and also classification of bialgebras in dimension 2 and 3 by Dekkar and Makhlouf. We obtain five 4-dimensional Hopf superalgebras and only one 2-dimensional Hopf superalgebra. In dimension 3, there is no Hopf superalgebra structures. Furthermore, we studied quasitriangular and twisted superbialgebras and Hopf superalgebras.

Jacques Alev, University of Reims (France)
The enveloping skewfields of some super Lie algebras.
In some previous work we studied mixed Weyl skewfields. In this talk we will describe how these appear as the enveloping skewfields of some super Lie algebras. This is joint work with Franois Dumas.

Ivn Ezequiel Angiono, University of Cordoba (Argentina)
Distinguished pre-Nichols algebras.
Let $Q = (q_{ij})$ be a matrix such that the corresponding Nichols algebra $B(V)$ of diagonal type is finite-dimensional. Among all the pre-Nichols algebras (i.e. braided graded Hopf algebras R generated as an algebra by its degree 1 part $R(1) = V$) there exists one, denoted by $B\ (V)$ and called the distinguished pre-Nichols algebra of V, which admits all the Lusztig isomorphisms as $B(V)$. For example if Q is a braiding corresponding to a finite-dimensional quantized enveloping (super)algebra $U_q(g)$ at a root of unity q, then $B\ (V)$ is precisely $U_q^+(g)$ while $B(V)$ is the positive part of small quantum group $u_q(g)$, obtained as a quotient of $U_q(g)$. $B\ (V)$ has a PBW basis with the same generators as for $B(V)$, but some of them have infinite height. We prove that $B\ (V)$ is a Noetherian braided Hopf algebra of finite GK dimension, but not a domain in general. We also prove that the subalgebra $Z^+(V)$ generated by some powers of PBW generators is a braided Hopf

subalgebra whose elements q-commute with the whole $B\ (V)$, and $B\ (V)$ is a free finite $Z^{+}(V)$-module. By bosonization of $B\ (V)$ with suitable abelian group algebras and taking Drinfeld doubles of these we obtain new examples of Noetherian pointed Hopf algebras of finite Gelfand-Kirillov dimension. Moreover each of them contains a q-commutative Hopf subalgebra such that the quotient is a Hopf algebra obtained by the same process over the Nichols algebra. These results generalize those for quantum groups at roots of unity by de Concini, Kac and Procesi.

Chengming Bai, Nankai University (China)
A framework for the study of the classical Yang-Baxter equation.
In this talk, I introduce a framework for the study of the classical Yang-Baxter equation. It was formed gradually from the study on the unification of the tensor and the operator forms of the classical Yang-Baxter equation with some algebraic structures behind them. Under this framework, we have obtained some results like certain generalizations of the classical Yang-Baxter equation with motivation from the study of integrable systems, some new algebraic structures with an operadic interpretation and some bialgebraic structures.

Vladimir Bavula, University of Sheffield (U.K.)
Weakly left localizable rings.
A new class of rings, the class of weakly left localizable rings, is introduced. Explicit criteria are given for a ring to be a weakly left localizable ring provided the ring has only finitely many maximal left denominator sets (eg, this is the case if a ring has a left Artinian left quotient ring).

Roland Berger, University of Saint-Etienne (France)
Koszul calculus and Calabi-Yau algebras.
It is a joint work with Andrea Solotar and Thierry Lambre. We introduce Koszul cup and cap products, defined in Koszul homology. These products are analogues of cup and cap products defined in Hochschild homology. Our motivation is to apply this Koszul calculus to the non-commutative Poincar duality (Van den Bergh duality) for Calabi-Yau algebras which are N-homogeneous, i.e. for Calabi-Yau algebras whose defining relations are homogeneous of degree N.

Julien Bichon, University of Clermont-Ferrand (France)
Cohomological dimensions of Hopf algebras.
I will discuss the relation between two possible notions of cohomological dimension for a Hopf algebra: the (usual) Hochschild cohomological dimension and the Gerstenhaber-Schack cohomological dimension. This is linked to the problem of relating the Hochschild cohomologies of Hopf algebras having equivalent tensor categories of comodules.

Boutheina Boutabia, University of Annaba (Algeria)

DKP particle in the one dimensional box.
We study the relativistic DKP particle in a one-dimensional box. We prove that it is impossible that the wavefunction vanishes completely at the walls of the box, and provide various boundary conditions for this problem.

Robert Coquereaux, CNRS University of Aix-Marseille (France)
Sum rules and conjugation properties for multiplicities in tensor products of representations of Lie groups and in the corresponding fusion products at level k.
The total multiplicity in the decomposition into irreducible representations (irreps) of the tensor products of two finite-dimensional irreps of a simple Lie algebra is invariant under conjugation of one of them. This sum rule also applies to fusion multiplicities for modular tensor categories arising from quantum groups at roots of unity, or from affine Lie algebras. In the latter cases it is related to a property of the modular S-matrix. In the case of $SU(3)$, we have more: not only the sum over multiplicities, but also the list of multiplicities, in the tensor products $\lambda \otimes \mu and \lambda \otimes \bar{\mu}$ are identical up to permutations. This presentation is based in part on work done in collaboration with J.-B. Zuber.

Juan Cuadra, University of Almeria (Spain)
On the existence of orders in semisimple Hopf Algebras.
A theorem of Frobenius states that the degree of any complex irreducible representation of a finite group G divides the order of G. The proofs of this result use a specific property of the group algebra $\mathbb{C}G$: it may be defined over $\mathbb{Z}$ or, in other words, the group ring $\mathbb{Z}G$ is a Hopf order of $\mathbb{C}G$.

Kaplansky's sixth conjecture predicts that Frobenius Theorem holds for complex semisimple Hopf algebras. There are several partial results in the affirmative. Compared to the case of groups, the main difficulty to prove this conjecture (if true) is that it is not guaranteed that a complex semisimple Hopf algebra H is defined over $\mathbb{Z}$ or, more generally, over a number ring. If it would be so, Larson proved that H satisfies Kaplansky's sixth conjecture. The question whether a complex semisimple Hopf algebra can be defined over a number ring has been part of the folklore of Hopf Algebra Theory.

In this talk we will show that this question has a negative answer. The family of examples that we will handle are Drinfeld twists of certain group algebras. The twist contains a scalar fraction which makes impossible the definability of such Hopf algebras over number rings. The results that will be presented are part of a joint work with Ehud Meir (University of Copenhagen) available at arXiv.org.

Rafael Diaz, University of Bogota (Colombia)
Deformations of N-differential graded algebras.
We introduce the concept of N-differential graded algebras (N-dga), and study the moduli

space of deformations of the differential of a N-dga. We prove that it is controlled by what we call the N-Maurer-Cartan equation. We provide geometric examples such as the algebra of differential forms of depth N on an affine manifold, and N-flat covariant derivatives. We also consider deformations of the differential of a q-differential graded algebra. We prove that it is controlled by a generalized Maurer-Cartan equation. We find explicit formulae for the coefficients involved in that equation. Deformations of the 3-differential of 3-differential graded algebras are controlled by the (3,N) Maurer-Cartan equation. We find explicit formulae for the coefficients appearing in that equation, introduce new geometric examples of N-differential graded algebras, and use these results to study N-Lie algebroids. We study higher depth algebras, and work towards the construction of the concept of A-N-1 -algebras.

Michel Dubois-Violette, CNRS Universit Paris-Sud (France)
The Weil algebra of a Hopf algebra.
We give a summary of a joint work with Giovanni Landi (SISSA) on a non commutative generalization of Henri Cartan's theory of operations, algebraic connections and Weil algebra. Publication reference : Commun. Math. Phys. 326, 851-874 (2014).

Agustin Garcia, University of Cordoba (Argentina)
Pointed Hopf algebras with abelian group.
We present the classification of pointed Hopf algebras with abelian group and braiding of Cartan type An. In particular we deal with roots of unity of low order to extend the results of Andruskiewitsch and Schneider. Our approach is through the Strategy of Lifting via Cocycle Deformation we developed in a previous article and that will be briefly described here. This is a first approach towards the complete classification of pointed Hopf algebras with abelian group.

Anthony Giaquinto, University of Chicago (USA)
Quantum Symmetry, Preferred Deformations, and the Peter-Weyl Theorem.
In this talk I will offer a fresh perspective on the explicit construction of "preferred deformations" of the bialgebra of functions on a reductive group or monoid. A preferred deformation is a quantization of the algebra structure which remains compatible with the original unchanged comultiplication on all elements. The construction uses the theory of "quantum symmetry" which establishes a correspondence between the ordinary symmetric elements in tensor space and those fixed by the action of an infinite group closely related to the Hecke algebra and the unitarized R-matrix. Along the way, this process yields a derivation of the Peter-Weyl Theorem in certain cases. In the case of SL(2), explicit structure constants are given in terms of q-Clebsch Gordan coefficients. Though generally not valid at roots of unity, the construction remains well-defined at both zero and infinity. This is joint with A. Gilman and P. Tingley and is a continuation of work with M. Gerstenhaber and S.D. Schack from the early 1990s.

José Gòmez-Torrecillas, University of Granada (Spain)
Weak multiplier bialgebras.
A non-unital generalization of weak bialgebra is proposed with a multiplier-valued comultiplication. Certain canonical subalgebras of the multiplier algebra (named the 'base algebras') are shown to carry coseparable co-Frobenius coalgebra structures. Appropriate modules over a weak multiplier bialgebra are shown to constitute a monoidal category via the (co)module tensor product over the base algebra. The relation to Van Daele and Wang's (regular and arbitrary) weak multiplier Hopf algebra is discussed. The results have been obtained in collaboration with G. Böhm and E. López-Centella.

Dimitri Gurevich, University of Valenciennes (France)
Derivatives in Noncommutative calculus and deformation property of quantum algebras.
The aim of my talk is twofold. First, I introduce analogs of (partial) derivatives on certain Noncommutative algebras, including some enveloping algebras and their "braided versions". Second, I discuss deformation property of some quantum algebras and show that contrary to a commonly held view the so-called "q-Witt algebra" does not have a good deformation property (i.e. it is not a deformation of its classical counterpart).

Vincel Hoang Ngoc Minh, University of Lille II (France)
(pure) Transcendence bases in ϕ-deformed shuffle bialgebras. Application to identify the locale coordinates in the groupe of associators.
We give the most general co-commutative deformations of the shuffle co-product and an effective construction of pairs of bases in duality. These allow us to identify the locale coordinates in the groupe of associators leading to the ideal of homogeneous polynomiale relations among polyzetas.

Ralf Holtkamp, University of Hamburg (Germany)
On symmetrized primitive operations.
Algebras that have vector space bases given by combinatorial objects like graphs, trees or permutations often have an additional structure and co-structure. Hopf algebra structures used in Connes-Kreimer's approach to renormalization of quantum field theories fit into the picture. We study how the primitives give rise to structures with infinite sequences of multilinear operations, certain sub-operads of magmatic operads. Especially we study the commutative magmatic case and explain how to obtain the primitive operations recursively.

Christian Kassel, University of Strasbourg (France)
Versal deformation spaces for quantum groups.
To any quantum group (or any Hopf algebra) we can associate a natural deformation space, which is a principal fiber bundle or a torsor in the sense of noncommutative geometry, whose fibers are "forms" of the original quantum group. In my lecture I will concentrate on the

base space of this bundle, namely the space of parameters of the deformation space: I will show how to construct and to compute it.

Giovanni Landi, University of Trieste (Italy)
The geometry of quantum lens spaces.
We define quantum lens spaces as 'direct sums of line bundles' and exhibit them as 'total spaces' of certain principal bundles over quantum projective spaces. For each of these quantum lens spaces we construct an analogue of the classical Gysin sequence. We use the sequence to compute the K-theory and the K-homology of the quantum lens spaces, in particular to give explicit geometric representatives of their K-theory classes. These representatives are interpreted as 'line bundles' over quantum lens spaces and generically define 'torsion classes'. We work out explicit examples of these classes.

Olav Arfinn Laudal, University of Oslo (Norway)
Algebras, Deformations, Gauge Groups and the standard model.
In this talk I shall show that the space, Hilb 2(R3), is the base space of a canonical family of associative R-algebras in dimension 4, furnishing a possible mathematical model for a Big Bang-scenario in cosmology. The study of the corresponding family of derivations leads to a natural way of introducing an action of the gauge Lie algebras of the Standard Model, in Hilb 2(R3). Introducing the notion of quotient spaces in non-commutative algebraic geometry, we obtain a geometry that seems to fit well with the set-up of the Standard Model. These subjects are all treated within the set-up of [5]. "Vos calculs sont corrects, mais votre physique est abominable" Albert Einstein to George Lematre, 1927.

Dominique Manchon, CNRS University of Clermont-Ferrand (France)
The double shuffle structure of the Ohno-Okuda-Zudilin q-multiple zeta values.
Several q-analogues of multiple zeta values have been explored in the recent years. The model recently proposed by Y. Ohno, J.-I. Okuda and W. Zudilin shows particularly good algebraic properties, and readily extends to arguments running over all the integers, regardless to the sign. We exhibit the iterated Jackson integral representation of these qMZVs, and describe the q-double shuffle relations thus obtained. Joint work with Jaime Castillo-Medina and Kurusch Ebrahimi-Fard.

Sylvie Paycha, University Potsdam (Germany)
A coproduct on cones and its applications.
From a complement map on a poset one can build a coproduct. We consider the complement map on the poset of (lattice) convex cones which to a face of a cone, assigns the transverse face. This coproduct is then used to derive Berline and Vergne's local Euler-Maclaurin formula on cones which relates exponential sums to exponential integrals. This is carried out by means of a Birkhoff-Hopf factorisation on the coalgebra of cones, which also gives rise to renormalised conical zeta values at non positive integers that generalise

multizeta values. This talk is based on joint work with Bin Zhang and Li Guo.

Anne Pichereau, University of Saint-Etienne (France)
Une algèbre Calabi-Yau vue comme déformation d'une algèbre de Poisson.
Dans le passage de la mécanique classique à la mécanique quantique, la première devrait être un cas limite de la seconde. En particulier, avec ce principe, le commutateur de variables dynamiques (mécanique quantique) devrait être l'analogue du crochet de Poisson (en mécanique classique). Dans un contexte mathématique, nous allons considérer une algèbre non commutative B et lui associer naturellement une algèbre (commutative) de Poisson S, si bien que l'algèbre B pourra être vue comme déformation de l'algèbre de Poisson S. Cette algèbre B fait partie d'une famille d'algèbres 3-Calabi-Yau définies par potentiels et dépendant d'un entier naturel n. L'algèbre B est pour nous l'exemple le plus intéressant du cas $n = 2$, et nous donnons des liens cohomologiques entre B et S. J'expliquerai aussi dans cet exposé ce que l'on peut obtenir à la suite de ces résultats en considérant les structures BV naturellement liées à ces algèbres. Ceci reprend des travaux en commun avec Roland Berger (St Etienne), puis avec Thierry Lambre (Clermont-Ferrand) et Patrick Le Meur (Paris 7).

Volodya Roubtsov, University of Angers (France)
Quantisation of Poisson structures on Painleve monodromy varieties.
We discuss quantum algebras related to affine cubics arising as monodromy data varieties for Painlev equation. We describe some examples of non-commutative cubics unifying "quantum Painlev cubics" and potentials for 3D Sklyanin algebras. Such general potentials appear in a description of moduli spaces of vacuum states in N=4 supersymmetric Yang-Mills field theory. The talk is based on my joint work in progress with M. Mazzocco.

Peter Schauenburg, Universit de Bourgogne (France)
Higher Frobenius-Schur indicators in group-theoretical fusion categories.
Higher Frobenius-Schur indicators are a series (indexed by a "degree" in the integers) of invariants of the simple objects in a pivotal fusion category. They generalize the (degree two) Frobenius-Schur indicator of an irreducible complex representation of a finite group, which indicates whether that representation has a realization over the real numbers. The general version has become a useful tool for the structure theory of fusion categories, but it is not altogether easy to compute in concrete examples. Group-theoretical categories are examples of fusion categories constructed from data involving finite groups (a finite group G and a subgroup H) and cohomology (a three-cocycle on G whose restriction to H is the coboundary of a given two-cochain on H). Their simple objects can be described in terms of finite groups (the stabilizers in H of its cosets in G) and their projective representaions. We discuss a formula that expresses Frobenius-Schur indicators in a group-theoretical fusion category entirely in terms of the group-theoretical data that builds the category.

Martin Schlichenmaier, University of Luxembourg (Luxembourg)
Lie superalgebras of Krichever-Novikov type.
Lie superalgebras of Krichever-Novikov type are certain algebras consisting of meromorphic half-forms on compact Riemann surfaces, which are holomorphic outside a given finite set of points. We introduce them, their almost-grading and their central extensions. We will show that there is up to equivalence and rescaling of the central element only one almost-graded central extension for a given such algebra with fixed almost-grading.

Yunhe Sheng, Jilin University (China)
On hom-Lie algebras and their categorification.
In this talk, I will revisit hom-Lie algebras and their representation. We show that $(\mathfrak{g}, [\cdot,\cdot], \alpha)$ is a hom Lie algebra if and only if $(\Lambda\mathfrak{g}^*, \alpha^*, d)$ is an (α^*, α^*)-differential graded commutative algebra. Associated to a representation, we show that there are a series of coboundary operators. We also introduce the notion of an omni-hom Lie algebra associated to a vector space and an invertible linear map. We show that regular hom Lie algebra structures on a vector space can be characterized by Dirac structures in the corresponding omni-hom-Lie algebra. The underlying algebraic structure of the omni-hom-Lie algebra is a hom-Leibniz algebra, or a hom-Lie 2-algebra. A hom-Lie 2-algebra is a categorification of a hom-Lie algebra. In a hom-Lie 2-algebra, the hom-Jacobi identity holds up to a natural isomorphism. I will introduce strict and skeletal hom-Lie 2-algebras in detail, and give examples from hom-left-symmetric algebras and symplectic hom-Lie algebras.

Sergei Silvestrov, Mlardalen University (Sweden)
Quasi Lie algebras and Hom-algebra structures.
In this talk, an overview will be presented of some recent developments on the subject of Hom-algebra, with focus on quasi Lie algebras, Hom-Lie algebras and related Hom-algebra structures. These objects appear for example when discretizing the differential calculus. Quasi Lie algebras encompass in a natural way the Lie algebras, Lie superalgebras, color Lie algebras, Hom-Lie algebras and various algebras of discrete and twisted vector fields arising for example in connection to algebras of twisted discretized derivations, Ore extension algebras, q-deformed vertex operators structures and q-deferential calculus, multiparameter deformations of associative and non-associative algebras, one-parameter and multi-parameter deformations of infinite-dimensional Lie algebras of Witt and Virasoro type some of which appear in the context of conformal field theory, string theory and deformed vertex models, multi-parameter families of quadratic and almost quadratic algebras that include for special choices of parameters algebras appearing in non-commutative algebraic geometry, universal enveloping algebras of Lie algebras, Lie superalgebras and color Lie algebras and their deformations. Common unifying feature for all these algebras is appearance of some twisted generalizations of Jacoby identities providing new structures of interest for investigation from the side of associative algebras, non-associative algebras, generalizations of Hopf algebras, non-commutative differential calculi beyond usual dif-

ferential calculus and generalized quasi-Lie algebra central extensions and Hom-algebra formal deformations and co-homology. Also in the talk, I will describe some related n-ary Hom-algebra generalizations of Nambu algebras, associative algebras and Lie algebras.

Arvid Siqveland, HBV University (Norway)
The Noncommutative Serre theorem.
Commutative algebraic geometry is made by letting direct limits of the local rings of a k-algebra A represent the rings of regular functions. These local rings can be computed by commutative deformation theory of modules, where the modules are the residues, that is $A/\mathfrak{p}$, $\mathfrak{p}$ prime. A noncommutative deformation theory is developed, where we consider finite families of modules $\{M_1, \ldots, M_r\}$ with incidences (tangents) between them. These objects are called diagrams. The noncommutative deformation theory computes the semi-local rings of a finite diagram, local in a set of points identified with modules, and we let the direct limits of these semi-local rings represent the semi-regular functions on the possibly infinite diagram. These notes are made to prove that this is a true generalization of the commutative algebraic geometry, in particular that if A is a commutative ring, if *diag* is the set of quotients by a prime ideal, i.e. $diag = \{A \to A/\mathfrak{p} | \mathfrak{p} \subset A \text{ prime}\}$, then the semi-local ring of *diag* gives the ring back:

$$\mathcal{O}(diag, \pi) = \mathcal{O}(\{A \to A/\mathfrak{p} | \mathfrak{p} \subset A \text{ prime}\}, \pi) \cong A,$$

where $\pi : \mathfrak{A} \to \mathfrak{k}$ is the forgetful functor.

Andrea Solotar, University of Buenos Aires (Argentina)
3-Calabi-Yau down-up algebras.

Down-up algebras $A(\alpha, \beta, \gamma)$ have been introduced by G. Benkart and T. Roby in [1] motivated by the algebra generated by the down and up operators on a differential partially ordered set.

Given $\alpha, \beta, \gamma \in \mathbb{C}$, the algebra $A(\alpha, \beta, \gamma)$ is generated over $\mathbb{C}$ by two elements d, u, subject to the relations

$$d^2u - \alpha dud - \beta ud^2 - \gamma d,$$
$$du^2 - \alpha udu - \beta du^2 - \gamma u.$$

Starting from Bardzell's resolution of associated monomial algebras and using Bergman's Diamond Lemma we obtained in [2] a free bimodule resolution of $A(\alpha, \beta, \gamma)$ of length 3. I will prove, using this resolution, that $A(\alpha, \beta, \gamma)$ is 3-Calabi-Yau if and only if $\beta = -1$. I will also prove that the algebra is monomial if and only if $\alpha = \beta = \gamma = 0$.

References

[1] Benkart, Georgia; Roby, Tom Down-up algebras. J. Algebra 209 (1998), no. 1, pp.305–344.

[2] Chouhy, Sergio; Solotar, Andrea, Projective resolutions of associative algebras and ambiguities. arXiv:1406.2300

Alexander Stolin, University of Göteborg (Sweden)
Classification of quantum groups

Blas Torrecillas Jover, University of Almeria (Spain)
Frobenius and separable functors for the category of generalized entwined modules.
The explicit structure of a cowreath in a monoidal category C leads us to the notion of generalized entwined module in a C-category. A cowreath can be identied with a coalgebra X in the Eilenberg-Moore category EM(C)(A), for some algebra A in C, and the Frobenius or separable property of the forgetful functor F from the category of generalized entwined modules to the category of representations over A is transferred to X and vice-versa. Actually, we show that F is Frobenius/separable if and only if X is a coFrobenius/coseparable coalgebra in EM(C)(A).A Maschke type theorem for generalized entwined modules is obtained for free with the help of the properties of a separable functor. We will see that various Frobenius and separable functors for the category of Doi-Hopf modules over Hopf algebras and their generalizations can be obtained as a special case of our theory. This is a joint work with D. Bulacu and S. Caenepeel.

Bruno Vallette, University of Nice Sophia-Antipolis (France)
Intersection theory and homotopical algebra.
The purpose of this talk is to establish a precise link between the intersection theory of the moduli spaces of genus 0 curves and homotopical algebra. More precisely, I will show that the Givental action on Cohomological Field Theories, also known as Hypercommutative algebras or Frobenius manifolds, sits inside the deformation theory of BatalinVilkovisky algebras. This will allow us to prove two conjectures of Kontsevich about the Givental action and the trivialization of the circle action. [Joint work with Vladimir Dotsenko and Sergei Shadrin. Reference: arxiv.org/1304.3343]

Friedrich Wagemann, University of Nantes (France)
Deformation quantization of Leibniz algebras.
Let h be a finite dimensional real Leibniz algebra. Exactly as the linear dual space of a Lie algebra is a Poisson manifold with respect to the Kostant-Kirillov-Souriau (KKS) bracket, h^* can be viewed as a generalized Poisson manifold. The corresponding bracket is roughly speaking the evaluation of the KKS bracket at 0 in one variable. This (perhaps

strange looking) bracket comes up naturally when quantizing h^* in an analoguous way as one quantizes the dual of a Lie algebra. Namely, the product $X > Y = exp(ad_X)(Y)$ can be lifted to cotangent level and gives than a symplectic micromorphism which can be quantized by Fourier integral operators. This is joint work with Benoit Dherin (2013). More recently, we developed with Charles Alexandre, Martin Bordemann and Salim Rivire a purely algebraic framework which gives the same star-product.

James Zhang, University of Washington (USA)
Nakayama automorphism and quantum group actions on Artin-Schelter regular algebras
The Nakayama automorphism of an Artin-Schelter regular algebra A controls the class of quantum groups that act on the algebra A. Several applications are given.

Yinhuo Zhang, University of Hasselt (Belgium)
Braided autoequivalences, quantum commutative Galois objects and the Brauer groups.
Let (H, R) be a finite dimensional quasitriangular Hopf algebra over a field k, and ${}_H\mathcal{M}$ the representation category of H. In this paper, we study the braided autoequivalences of the Drinfeld center ${}^H_H\mathcal{YD}$ trivializable on ${}_H\mathcal{M}$. We establish a group isomorphism between the group of those autoequivalences and the group of quantum commutative bi-Galois objects of the transmutation braided Hopf algebra ${}_RH$. We then apply this isomorphism to obtain a categorical interpretation of the exact sequence of the equivariant Brauer group BM(k, H, R) established by Zhang. To this end, we have to develop the braided bi-Galois theory initiated by Schauenburg , which generalizes the Hopf bi-Galois theory over usual Hopf algebras to the one over braided Hopf algebras in a braided monoidal category.