**Jean-Louis Clerc** (Université Henri Poincaré, Nancy)

CONSTRUCTION OF CONFORMALLY COVARIANT DIFFERENTIAL AND BIDIFFERENTIAL OPERATORS ON THE SPHERE AS RESIDUES

For three generic representations of the spherical principal series on the sphere $S$, we construct an invariant trilinear form on $\mathcal{C}^\infty(S)$. The family depends meromorphically on the parameters. The residues at the poles are computed, and are related to covrariant differential/bidifferential operators on $S$. A major role is played by Bernstein-Sato identities, yielding new formulas for these operators.

**Charles H. Conley** (University of North Texas)

APPLICATIONS OF CLASSICAL REPRESENTATION THEORY TO QUANTIZATION

We will describe some applications of the representation theory of finite dimensional simple Lie algebras to quantization over Euclidean manifolds. We will discuss the projective quantization of differential operator modules of $\mathrm{Vect}(\mathbb{R}^m)$, and in odd dimensions, the conformal quantization of the restriction of these modules to the subalgebra of contact vector fields.

We will show how the Casimir operators can be used to detect resonant cases, how Clebsch-Gordan rules can be used to classify the affine-invariant maps and hence to construct the quantization in the non-resonant cases, and how lowest weight vectors help to compute the quantized vector field actions.

**Christian Duval** (Université d'Aix-Marseille)

QUANTUM INTEGRABILITY AND CONFORMALLY EQUIVARIANT QUANTIZATION

We will introduce a new Liouville-integrable system, namely the dual Jacobi-Moser system, associated with the geodesic flow on the n-sphere endowed with a conformally flat metric projectively equivalent to that of the n-ellipsoid. Subsequently, we will prove that quantum integrability of both dual Jacobi-Moser and Neumann-Uhlenbeck systems is actually ensured by means of conformally equivariant quantization. This is joint work with Galliano Valent (LPTHE).

**Amine El Gradechi** (Université d'Artois, Lens)

RANKIN-COHEN BRACKETS (to be confirmed)

**Daniel J.F. Fox** (Universidad Politecnica, Madrid)

T.B.A.

**Maxim Grigoriev** (Lebedev Physics Institut, Moscow)

BRST formalism, equivariant quantization, and higher spin fields

A powerful approach to quantization in which space-time symmetries are manifestly built into the formalism is discussed. The control over the symmetries is achieved through the use of the Fedosov-like quantization procedure generalized to the case of constrained Hamiltonian systems. The approach can be naturally formulated within the BRST quantization framework which is especially useful if genuine gauge systems are concerned. From the field theory point of view the approach amounts to so-called parent BRST formulation used, in particular, to describe general gauge fields (often called "higher spin fields") subject to invariant equations of motion. As an illustration a concise formulation of most general gauge fields on anti-de Sitter space is presented. Another illustration is the manifestly conformal description of bosonic singletons and their higher symmetries. In the simplest case of the scalar singleton this reproduces the algebra of higher symmetries obtained by Eastwood. In both the examples one can explicitly see how the respective tractor calculus arise in a natural way upon elimination of certain auxiliary variables.

**Dimitri Gurevitch** (Université de Valenciennes)

$q$-Equivariant quantization and Braided Geometry

I consider some Poisson brackets whose quantization leads to algebras looking like enveloping algebras but equipped with deformed traces. It turns out that these algebras can be naturally described in terms of the so-called Reflection Equation algebra. This algebra is the main object of Geometry related to braidings, i.e. solutions to the Quantum Yang-Baxter Equation. Braided analogs of some classical objects and operators (Lie algebras, vector fields, affine varieties) arising from a quantization will be introduced.

**Hovhannes Khudaverdian** (University of Manchester)

Differential operators and algebra of densities

We consider the commutative algebra of densities on a manifold $M$. This algebra is endowed with the canonical scalar product and we shall consider self-adjoint operators on this algebra. There are singular values of weights for operators of a given order. These singular values lead to an interesting geometrical picture: 1) If $M$ is the real line we arrive at classical constructions in projective geometry. 2) $M$ is odd symplectic supermanifold we arrive at the Batalin-Vilkovisky groupoid. We also introduce a certain mapping on differential operators on algebra of densitites and we relate this mapping with full symbol maps. The talk is based on works with Ted Voronov and on a work in progress with Adam Biggs.

**Pierre Mathonet** (University of Luxembourg)

Super equivariant quantization (to be confirmed)

**Jean-Philippe Michel** (University of Luxembourg)

Higher Symmetries of Laplacian via quantization

**Valentin Ovsienko** (CNRS, Université Claude Bernard, Lyon)

Second order Lie derivative revisited

**Fabian Radoux** (Université de Liège)

Natural and invariant quantizations

The concept of invariant quantization comes from quantum physics, more precisely from the concept of prequantization introduced by P. Dirac. The geometric quantization of the cotangent bundle $T^*M$ of a manifold $M$, which comes from the notion of prequantization, consists in a particular situation of a map which associates with a polynomial function of degree less than or equal to one on $T^*M$ (also called symbol of degree less than or equal to one) a differential operator on $M$.

The aim of the equivariant quantization is to extend this geometric quantization to the whole space of symbols. As this prolongation is not unique, one imposes to the quantization a condition of invariance with respect to the action of a Lie group to reestablish the uniqueness. More precisely, when a Lie group $G$ acts on a manifold $M$, this action can be lifted to the space of symbols and to the space of differential operators and one can wonder if there exists a quantization which is an intertwining for the action of $G$. When $M$ is the projective space and when $G$ is the projective group, this gives rise to the notion of projectively equivariant quantization whereas when $M$ is $S^p \times S^q$ and $G$ is $SO(p+1, q+1)$, this gives rise to the notion of conformally equivariant quantization. This notion of equivariant quantization has been notably studied by C. Duval, P. Lecomte and V. Ovsienko.

The notion of projectively (resp. conformally) equivariant quantization has a counterpart on an arbitrary manifold, the notion of natural and projectively (resp. conformally) invariant quantization. This quantization depends on a connection (resp. on a metric) but only on its projective (resp. conformal) class and is natural in all of its arguments.

During the talk, I will show how to solve the problem of natural invariant quantization using the theory of Cartan connections by adapting the method used to solve the problem of equivariant quantization on the Euclidean space.

**Joseph Silhan** (University of Masaryk)

Invariant quantization and parabolic geometries

**Stefan Waldmann** (University Freiburg)

FRECHET-ALGEBRAIC DEFORMATION QUANTIZATION OF THE POINCARE DISC

In this talk, I will report on a joint project with Svea Beiser on a Frechet-algebraic deformation quantization of the Poincare disc and its higher dimensional cousins. The formal star product on the disc with a very explicit formula is known for many years now. Our contribution is to impose convergence conditions and to establish a Frechet topology for which the star product is continuous. The resulting Frechet algebra carries the symmetry of the disc and has several additional features.