### 2023 Winter School in Mathematical Physics



# **Report of Contributions**

Short talk: Corner Structure of …

Contribution ID: 1

Type: not specified

### Short talk: Corner Structure of Four-Dimensional General Relativity in the Coframe Formalism

Wednesday 11 January 2023 10:20 (25 minutes)

In this talk I will describe a local Poisson structure (up to homotopy) associated to corners in fourdimensional gravity in the coframe (Palatini–Cartan) formalism. This is achieved through the use of the BFV formalism. This is a joint work with A. S. Cattaneo

Presenter: CANEPA, Giovanni (CPT Marseille)

Contribution ID: 2

Type: not specified

#### Short talk: Lie bialgebra structures on loop algebras and torsion-free sheaves of Lie algebras on nodal irreducible cubic curves

Wednesday 11 January 2023 09:00 (25 minutes)

Lie bialgebra structures are fundamental to the theory of quantum groups proposed by Drinfeld in the late eighties. One of the most important examples is the standard bialgebra structure on a symmetrizable Kac-Moody algebra. In the affine case, this structure induces a Lie bialgebra structure on the underlying loop algebra. In this talk, I will relate all twistings of this Lie bialgebra structure to torsion-free sheaves on nodal irreducible cubic curves and to trigonometric solutions of the classical Yang-Baxter equation. This connections result in a classification of these objects.

Presenter: ABEDIN, Raschid

Contribution ID: 3

Type: not specified

#### Short talk: Bow varieties, stable envelopes and 3d-mirror symmetry

Wednesday 11 January 2023 09:30 (25 minutes)

Mirror symmetry for 3d N=4 supersymmetric gauge theories has recently received plenty of attention in both representation theory and mathematical physics. It predicts that Higgs and Coulomb branches of a pair of dual theories are interchanged, and hence that both pairs of homologous branches (Higgs-Higgs and Coulomb-Coulomb) share exceptional topological and geometric properties. One of the predictions of mirror symmetry is that elliptic stable envelopes, which are certain topological classes intimately related with elliptic quantum groups, are the same after appropriate identifications. In this talk I will focus on Coulomb and Higgs branches of type A, which are collectively described by a class of varieties known as Cherkis bow varieties, and I will discuss the main ideas behind the proof of mirror symmetry of sable envelopes (joint work in progress with Richard Rimanyi).

Presenter: BOTTA, Tommaso Maria (ETH Zurich)

Short talk: A homotopy Poisson s ···

Contribution ID: 4

Type: not specified

#### Short talk: A homotopy Poisson structure from Poisson reduction

Wednesday 11 January 2023 10:50 (25 minutes)

Applying the BFV-BRST techniques from field theory to the hamiltonian reduction of degree one graded symplectic manifolds, we obtain a homotopy version of the classical Konstant-Sternberg BRST algebra in a generalized hamiltonian context. This is based on the correspondence between hamiltonian symplectic degree one manifolds and Poisson manifolds, due to Roytenberg, and the relation between degree one graded reduction and standard Poisson reduction explored by Cattaneo and Zambon.

Presenter: CARVALHO SILVA, Pedro Henrique (UZH)

Short talk: Hamiltonian dynamics ···

Contribution ID: 5

Type: not specified

### Short talk: Hamiltonian dynamics and multiplicative groupoids

Wednesday 11 January 2023 11:20 (25 minutes)

We use local symplectic Lie groupoids to construct Poisson integrators for generic Poisson structures. More precisely, recursively obtained solutions of a Hamilton-Jacobi-like equation are interpreted as Lagrangian bisections in a neighborhood of the unit manifold, that, in turn give Poisson integrators. We also insist on the role of the Magnus formula, in the context of Poisson geometry, for the backward analysis of such integrators.

The talk is based on the preprint "Symplectic groupoids for Poisson integrators" (Cosserat, 2022, arXiv:2205.04838).

Presenter: COSSERAT, Oscar (La Rochelle Université)

Contribution ID: 7

Type: not specified

### Short talk: Deformations of holographic symmetry algebras

Wednesday 11 January 2023 17:30 (25 minutes)

The celestial holography program centres around a conjectural holographic duality between a QFT in an asymptotically flat 4d bulk and a 2d CFT on the celestial sphere, the "CCFT". There is no dynamical evidence for this conjecture to date but symmetries of the bulk theories restrict the CCFT. For (selfdual) gravity in the bulk, Strominger et al found a symmetry algebra closely related to  $w_{1+\infty}$ . From a 2d CFT point of view, this algebra has well-known deformations which were conjectured to correspond to quantum effects in the bulk. In arXiv:2208.13750v2, we showed that such deformations actually arise when turning on a Moyal deformation in the 4d bulk.

**Presenter:** HEUVELINE, Simon (University of Cambridge)

Short talk: Hikita conjecture for ···

#### Contribution ID: 8

Type: not specified

### Short talk: Hikita conjecture for Gieseker varieties

Wednesday 11 January 2023 18:00 (25 minutes)

Symplectic duality is an observation that symplectic resolutions tend to come in pairs with matching geometric properties. Equivariant Hikita-Nakajima conjecture is one such statement, which connects the geometric and algebraic properties of symplectically dual pairs. In this talk I try to explain, what is usually meant by symplectic duality, provide some examples and state the conjecture I am working on. The talk is based on a joint work with Vasily Krylov (arXiv:2202.09934).

Presenter: SHLYKOV, Pavel (University of Toronto)

Short talk: Polydifferential Lie op ...

Contribution ID: 9

Type: not specified

## Short talk: Polydifferential Lie operad and applications

Wednesday 11 January 2023 18:30 (25 minutes)

I will present the operad  $O(Lie_d)$  obtained by applying a functor constructed by S. Merkulov and T. Willwacher to the operad  $Lie_d$  of (degree shifted) Lie algebras. Then I will show some applications and properties of said operad.

Presenter: WOLFF, Vincent (University of Luxembourg)