# XXXth International Colloquium on Group Theoretical Methods in Physics



# **Programme**

14-18 July 2014

**Ghent University - Belgium** 



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#### **Sponsors**

- International Union of Pure and Applied Physics (IUPAP): "To secure IUPAP sponsorship, the organisers
  have provided assurance that the 30th ICGTMP will be conducted in accordance with IUPAP principles as
  stated in the IUPAP resolution passed by the General Assembly in 2008. In particular, no bona fide scientist
  will be excluded from participation on the grounds of national origin, nationality, or political considerations unrelated to science."
  - Group30 receives formal IUPAP endorsement without financial sponsorship.
- International Solvay Institutes
- International Association of Mathematical Physics (IAMP)
- Clay Mathematics Institute (CMI)
- Elsevier
- Springer Birkhäuser
- American Institute of Physics (AIP Publishing)
- Foundation Compositio Mathematica
- National Science Foundation US
- The Research Foundation Flanders (FWO)
- Le Fonds de la Recherche Scientifique (FNRS)
- Ghent University, Faculty of Sciences
- Ghent University, Clifford Research Group, Faculty of Engineering and Architecture

























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#### **Local Organizers**

Fred Brackx, Hennie De Schepper, Joris Van der Jeugt (Chair)

#### Venue

All scientific activities take place in the university building "Joseph Plateau", Joseph Plateaustraat 22, 9000 Gent.

The plenary talks take place in Lecture Room A (ground floor, left wing).

The parallel sessions will take place in Lecture Rooms D, E, F, G, H, I (first floor).

Joseph Antoine Ferdinand Plateau (1801-1883), Belgian physicist, professor of experimental physics at Ghent University. Inventor of the phenakistoscope (an early animation device that used a spinning disk of sequential images and the persistence of vision principle to create an illusion of motion). He studied the phenomena of capillary action and surface tension and formulated the laws which describe the structures formed by soap films. The mathematical problem of existence of a minimal surface with a given boundary is named after him.

The Plateau building dates back to 1889 and housed the Faculty of Sciences. It was designed by architect Adolphe Pauli (1820-1895), professor at the 'Ecoles Spéciales du Génie Civil et des Arts et Manufactures', the then education of engineers, which was incorporated in the Faculty of Sciences until 1957 when an independent Faculty of Applied Sciences (nowadays Faculty of Engineering and Architecture) was founded. Adolphe Pauli was a disciple of architect Louis Roelandt, the designer of the university's great hall "Aula Academica" in the Voldersstraat (see The Wigner Medal and Weyl Prize Ceremony).

#### **Registration and Conference Office**

J. Plateau Building, meeting room Simon Stevin (ground floor, left wing, opposite Lecture Room A).

#### Opening hours:

- Sunday 16:00-20:00
- Monday, Tuesday and Thursday 8:00-12:00 and 13:30-16:30
- Wednesday and Friday 8:00-12:00.

Telephone: +32 9 264 37 34

Mobile: +32 491 13 21 60 (in case of urgency)

#### **Coffee breaks**

Coffee / tea and biscuits are served daily from Monday 14 till Friday 18 during the breaks in the morning and afternoon sessions in the foyer 1st floor.

#### **Computers and WIFI**

Computers are available in PC-rooms E and F (first floor).

#### PC-rooms

Participants have access to the PC's in **PC-rooms E and F (first floor).** Just switch on the PC, enter for account "UGentGuest" and enter a blank password.

#### Eduroam

You can have access to the internet with your mobile device or notebook by connecting to the eduroam wifi network. At UGent you follow your university or institution's logon procedure.

#### **UGENTGUEST** wifi

If your university or institution is not participating in eduroam you can access the UGentGuest wifi network by the following instructions.

Make a wireless connection with "UGentGuest". If you have set up to request an IP address automatically, you will receive an IP address starting with 193.190.8x.

Now you are connected, but not yet authenticated. You should start a web browser and you will be redirected to a logon screen. Enter the username and password that you receive at the first day of the colloquium. After correct authentication you can use the Internet connection.

Your connection to this wireless LAN is not encrypted. To protect your personal data, please use encrypted connections like https, imaps, ssh etc. or a VPN client. You are not allowed to pass on the login information to others.

#### **Group photo**

Wednesday 16 July at 10:25 on the stairs in front of the J. Plateau Building.

#### **Book exhibition**

Stands in the foyer 1st floor:

- AIP (American Institute of Physics, Melissa Patterson)
- Elsevier (Valéry Teng-Broug)
- Springer-Birkhäuser (Thomas Hempfling)

#### Welcome drink

A welcome drink is offered on Monday 14 July, from 18:30 till 20:00, in the *Pacificatiezaal* of Town Hall, Botermarkt 1, 9000 Gent. Welcome speech by Alderman Christophe Peeters. (Invitation in your conference bag.)

The peace treaty "Pacification of Ghent", signed in this historic location on 8 November 1576, forged an alliance of the provinces of the Habsburg Netherlands, the so-called General Union.

#### The Wigner Medal and Weyl Prize Ceremony

The traditional presentation of the Wigner Medal and the Hermann Weyl Prize is scheduled on Wednesday 16 July at 18:30 in the Aula of Ghent University, Voldersstraat 9, 9000 Gent. (Invitation and programme in your conference bag.)

Ghent University was opened on 9 October 1817. The original four faculties consisted of Humanities (Letters), Law, Medicine and Science, and the language of instruction was Latin. The university was founded by King William I as part of a policy to stem the intellectual and academic lag in the southern part of the United Kingdom of the Netherlands, later to become Belgium.

The Aula Academica was inaugurated on 3 October 1826. This "University Palace" was a present of the City of Ghent and testified of the splendour of the town and its university.

#### Guided tour — Boat trip

Guided tour in the historic centre of Ghent on Wednesday 16 July, from 14:00 till 16:00.

Venue: the new City Pavilion, located next to Town Hall and at the foot of the Belfry.

Followed by a 40 minute boat trip on the canals of the inner city. A boat trip ticket is needed; it is available, free of charges, at the Conference Office, **only on Sunday 13 and Monday 14 July!** 

#### **Banquet**

The conference banquet is scheduled on Thursday 17 July at 19:00 in the *Brasserie HA'* (Handelsbeurs), Kouter 29, 9000 Gent. You should present your invitation card (see your conference bag).

The oldest part of the "Handelsbeurs" was built in 1738-1739. It housed the Ghent Stock Exchange. After restoration it was turned into a concert hall.

#### **Breakfast**

Participants staying in the student rooms of Ghent University can have breakfast at the student restaurant "De Brug", Sint-Pietersnieuwstraat 45, 9000 Gent. (see "Lunch" for the location.) This is open for breakfast from 8:00 to 10:00. You will receive breakfast tickets when checking in at the Guest House.

#### Lunch

Participants can have a (modest but healthy) lunch, from Monday 14 till Friday 18, at the student restaurant "De Brug", Sint-Pietersnieuwstraat 45, 9000 Gent. (When leaving the Plateau Building, take right, pass Magnelstraat and continue till the Sint-Pietersnieuwstraat; the student restaurant is situated to the right of the parking place in front of you.)

Opening hours: 11:45 - 14:00

Cash payment is **not** possible, you should use the lunch tickets to be found in your conference bag.

Lunch is also possible, at your own expenses, at the following places in the vicinity of the Plateau Building.

In the street of the student restaurant, Sint-Pietersnieuwstraat, there are also the following possibilities:

Thalia, Sint-Pietersnieuwstraat 138, <a href="http://www.eethuis-thalia.be">http://www.eethuis-thalia.be</a>: quiche, salads, pasta

Le Pain Total, Sint-Pietersnieuwstraat 218, http://www.lepaintotal.be: snacks, veggie, sandwiches

La Perla, Sint-Pietersnieuwstraat 212: Italian cuisine

In the opposite direction, when leaving the Plateau Building, take left and go downwards to ultimately Kortrijksepoortstraat – Nederkouter. At the corner left you find

**'t Hoekske**, Kortrijksepoortstraat 1, <a href="http://www.snackbarthoekske.be">http://www.snackbarthoekske.be</a>: traditional snacks, sandwiches, open daily 24/24

If you cross the street and continue in the direction of the canal, then at your left you find

**Potatolicious**, Verlorenkost 5, <a href="http://potatolicious.be">http://potatolicious.be</a>: healthy food, salads, filled jacked potatoes, excellent coffees and teas

If, on the contrary, you take right, then you enter Nederkouter street, with a number of possibilities:

Pane e Vino, Nederkouter 9, <a href="http://www.pane-vino.eu">http://www.pane-vino.eu</a>: genuine Italian restaurant

Pasta Fresca, Nederkouter 37, <a href="http://www.pasta-fresca-gent.be">http://www.pasta-fresca-gent.be</a>: pasta

Greenway, Nederkouter 42, <a href="http://greenway.be">http://greenway.be</a>: vegetarian food

Panorama, Nederkouter 71, <a href="http://www.panoramabar.be">http://www.panoramabar.be</a>: coffee shop, bar

Wasbar, Nederkouter 109, http://www.wasbar.be: snacks, coffee /tea (and you can do your laundry)

**Caffè Caffee**, Nederkouter 129, <a href="http://www.caffecaffee.be">http://www.caffecaffee.be</a>: breakfast, lunch, snacks, salads, sandwiches, coffee / tea

**Wickerhoff**, Nederkouter 135, <a href="http://www.wickerhoff.be">http://www.wickerhoff.be</a>: traditional cuisine (only on Wednesday, Thursday and Friday)

If, at the end of the Plateaustraat, you take sharply left and go uphill, this is Sint-Kwintensberg street, you find in this direction

Bluesette, Sint-Kwintensberg 85, <a href="http://www.eetcafebluesette.be">http://www.eetcafebluesette.be</a>: traditional snacks

And further on:

Firenze, Sint-Amandstraat 1, <a href="http://www.restaurantfirenze.be">http://www.restaurantfirenze.be</a>: genuine Italian restaurant

Petrus, Sint-Amandstraat 15: traditional snacks, vegetarian

Orientali, Sint-Amandstraat 19: thai kitchen

Paul's Boutique, Sint-Amandstraat 48, beefburger, pasta

#### Programme for accompanying persons

Daily trips will be arranged during the colloquium days, guided by a local. Accompanying persons who want to join meet at 10:00h near the registration office. Tentative programme:

- Monday: visit of some monuments in medieval Ghent (Saint Bavo's Cathedral with "The Mystic Lamb", the Belfry tower, the Castle of the Counts).
- Tuesday: STAM (Ghent City Museum), Saint Peter's Church and Abbey.
- Wednesday: Museum of Fine Arts (morning). In the afternoon all accompanying persons can join the excursion and boat trip for all participants.
- Thursday: excursion to Bruges.
- Friday: the Friday market, visit of a monastery (Caemersklooster) and Patershol (an authentic medieval district).

#### Panel discussion

Recent advances and future challenges in group theoretical methods in physics

Wednesday 16 July from 11:30 till 12:30, lecture room D (1st floor).

Moderator: W. Miller Jr

#### Special session honouring the work of Allan Solomon

Wednesday 16 July from 09:00 till 10:00, lecture room D.

Allan Solomon, honorary member of the Standing Committee of "International Colloquium of Group Theoretical Methods in Physics", passed away in April 2013. Allan held Emeritus Professorships at the Open University (UK) and the University of Paris VI (France). He was a full member of the Standing Committee from 1986 until December 2008, after which he became an honorary member. He was among the most active contributors to the organization of our Colloquia, and his wisdom and wit were universally appreciated.

He will be missed and remembered by many, and for a very long time.

#### **Programme: Poster session**

**Noud Aldenhoven** Matrix valued orthogonal polynomials related to the quantum analogue of

(SU(2)+SU(2), diag)

Erik Diaz-Bautista Supersymmetric harmonic oscillator and nonlinear coherent states

Bruno Gonçalves The exact Foldy-Wouthuysen transformation for a Dirac theory with the com-

plete set of CPT/Lorentz violating terms

**Lenka Háková**Generalization of Weyl group orbit functions using matrix immanants **Elchin Jafarov**su(2) Krawtchouk oscillator model under the CP deformed symmetry

Seiichi Kuwata Phase amplitude conformal symmetry in Fourier transforms

Georgios Papamikos Darboux transformation with Dihedral reduction group

Regina Ricotta Quantum Confinement in Hydrogen Bond

Mihaela B Vajiac Multihyperbolic Analysis

Mario Van Raemdonck Exploring the phase diagram of the px + ipy pairing Hamiltonian by linking the

eigenstates to associated bosonic states.

Posters are on display in the foyer and the corridor at the first floor.

The poster session is scheduled on Tuesday, 15 July, during the coffee break from 09:55 till 10:35.

Poster should be removed Friday 18 at noon.

## **Programme: Plenary lectures and overview**

## Sunday, 13 July 2014

16:00-20:00 Registration at the Conference Office

## Monday, 14 July 2014

08:00-09:00	Registration at the Conference Office
09:00-09:10	Opening (lecture room A, ground floor)
09:10-10:05	Luc Vinet: The Bannai-Ito algebra and some applications
10:05-10:35	Coffee break
10:35-11:30	<b>Gitta Kutyniok</b> : α-Molecules: Wavelets, Shearlets, and beyond
11:30-12:25	Christoph Schweigert: Surface defects and symmetries
12:25-14:00	Lunch break
14:00-15:30	Parallel sessions
15:30-16:00	Coffee break
16:00-18:00	Parallel sessions
18:30-20:00	Welcome drink in the Town Hall of Ghent (Botermarkt, Gent)

### Tuesday, 15 July 2014

09:00-09:55	Alberto De Sole: Poisson vertex algebras and Hamiltonian equations
09:55-10:35	Coffee break + Poster session
10:35-11:30	Rui Loja Fernandes: Lie theory beyond Lie groups
11:30-12:25	Matthias Christandl: Entanglement, Entropy and Representation Theory
12:25-14:00	Lunch break
14:00-15:30	Parallel sessions
15:30-16:00	Coffee break
16:00-18:00	Parallel sessions

## Wednesday, 16 July 2014

09:00-10:00	Parallel sessions & Special session honouring the work of Allan Solomon
10:00-10:25	Coffee break
10:25-10:30	Group photo
10:30-11:30	Parallel sessions
11:30-12:30	Panel discussion: recent advances and future challenges in group theoretical methods in physics
12:30-14:00	Lunch break
14:00-17:00	Guided tours
18:30-20:00	Wigner Medal and Weyl Prize Ceremony (Aula of Ghent University, Voldersstraat 9, Gent)
	Reception

## Thursday, 17 July 2014

09:00-09:55	Yuji Tachikawa: Comments on supersymmetric quantum field theories
09:55-10:35	Coffee break
10:35-11:30	Joshua Zak: Symmetric coordinates in solids. Magnetic Bloch oscillations
11:30-12:25	Amiram Leviatan: Partial and quasi dynamical symmetries in quantum many-body systems
12:25-14:00	Lunch break
14:00-15:30	Parallel sessions
15:30-16:00	Coffee break
16:00-18:00	Parallel sessions
19:00-22:30	Conference Banquet (Handelsbeurs, Kouter 29, Gent)

## Friday, 18 July 2014

09:00-09:55	Karl-Hermann Neeb: Reflection positivity and unitary representations of Lie groups
09:55-10:35	Coffee break
10:35-11:30	François Gay-Balmaz: Group theoretical methods in liquid crystal dynamics
11:30-12:25	Nicolai Reshetikhin: Integrable boundary conditions and corresponding q-Knizhnik-Zamolodchikov
	equation
12:25-14:00	Lunch break
14:00-15:30	Parallel sessions
15:30-16:00	Coffee break
16:00-18:00	Parallel sessions

## Programme: Parallel sessions

## Monday 14 July

Room	Lecture room D	Lecture room E	Lecture room F
Topic	Quantum systems and quantum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
14:00 - 14:25	Gerald A. GOLDIN	Francesco TOPPAN	Willard MILLER JR
	Generalized hydrodynamical variables for quantum mechanics, and the group of nonlinear gauge transformations	Four types of superconformal mechanics: D-module reps and invariant actions	The theory of contractions of 2D 2nd order quantum superintegrable systems
14:30 - 14:55	Hendrik GRUNDLING	Zhanna KUZNETSOVA	Sarah POST
	Crossed products of C*- algebras for singular actions	N-extended Galilei superconformal algebras and their representations.	The classification of superintegrable systems and contractions of quadratic algebras
15:00 - 15:25	Giovanni RASTELLI	Patrick MOYLAN	Claudia CHANU
	Second-order symmetry operators and separation of variables for Dirac equation with external fields on two-dimensional spin manifolds	Localization and q- deformations of Lie algebras and superalgebras	Extensions of natural Hamilto- nians
15:30 - 16:00		Coffee Break	
Topic	Quantum systems and quantum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
16:00 - 16:25	Inge Svein HELLAND	Vladimir DOBREV	Javier NEGRO
	The quantum formulation derived from assumptions of epistemic processes.	Invariant Differential Operators for Non-Compact Lie Algebras Parabolically Related to Con- formal Lie Algebras	Superintegrable anisotropic oscillators on two-dimensional spheres and hyperboloids
16:30 - 16:55	Giuseppe NISTICO	Naruhiko AIZAWA	Christiane QUESNE
	A Group Theoretical approach to Quantum Theory of Interac- tion	Representations of conformal Galilei algebra with integer spin and an application	Ladder operators for solvable potentials connected with exceptional orthogonal polynomials
17:00 - 17:25	Seckin KURKCUOGLU	Ehud Moshe BARUCH	lan MARQUETTE
	Constructing the Quantum Hall System on the Grassmannians Gr_2(C^N)	Strong contraction of the Discrete Series representations of SU(1,1) via the Kirillov model	New families of superintegrable systems from k-step rational extensions, polynomial algebras and degeneracies
17:30 - 17:55	Stephen LOW	Matvei LIBINE	George POGOSYAN
	Maximal quantum mechanical symmetry: Projective representations of the inhomogeneous symplectic group	Feynman Diagrams, Representations of U(2,2) and Quaternionic Analysis	Superintegrable Systems on the Three-Dimensional Hyperboloids

## Monday 14 July

Room	Lecture room G	Lecture room H	Lecture room I
Topic	Group theory in quantum information theory and quantum computation	String theory, quantum gravity and conformal field theory	Geometric mechanics and symmetry
14:00 - 14:25	Hubert DE GUISE	Nikolai GROMOV	Madeleine JOTZ LEAN
	Landscape symmetries in three-photon coincidence land-scapes	Low and Higher Energy Limits of Electroweak Model as Contraction of its Gauge Group	Dorfman connections and Courant algebroids
14:30 - 14:55	Ulrich SEYFARTH	Anton ZEITLIN	Jan-Willem VAN HOLTEN
	Structure of the sets of mutually unbiased bases with cyclic symmetry	Beltrami-Courant Differentials and Homotopy Gerstenhaber algebras	Gauge-covariant extensions of Killing tensors and conservation laws
15:00 - 15:25	Vladimir GERDT	Fumihiko SUGINO	Manuel DE LEÓN
	On description of the orbit space of unitary actions for mixed quantum states	Spontaneous supersymmetry breaking and instanton sum in 2D type IIA superstring theory	A Hamilton-Jacobi theory for Classical Field Theories: finite and infinite dimensional set- tings
15:30 - 16:00		Coffee Break	
Topic	Statistical models, exact solu- tions	Hopf algebras and quantum groups	Integrable models and related topics
16:00 - 16:25	Jorgen RASMUSSEN	Jun MURAKAMI	Tudor RATIU
	Exactly solvable model of critical dense polymers	Logarithmic knot invariants coming from the restricted quantum groups	Lagrangian reductions and integrable systems in condensed matter
16:30 - 16:55	Alexi MORIN-DUCHESNE	Alberto HERNÁNDEZ	Jon LINKS
	Integrability in the dimer model	Tensor Powers of Galois Corings	Molecular fraction calculation for an atomic-molecular Bose- Einstein condensate model
17:00 - 17:25	Yvan SAINT-AUBIN	Wei WANG	Inna LUKYANENKO
	Indecomposable representations of Temperley-Lieb algebras and their role in statistical physics	On the Hopf algebra structures of generalized Radford's biproducts	On the boundaries of quantum integrability for the spin-1/2 Richardson-Gaudin system
17:30 - 17:55		Bojana FEMIC	Stijn DE BAERDEMACKER
		Villamayor-Zelinsky sequence for braided finite tensor cate- gories	Integrable Dicke and Jaynes- Cummings models, and exten- sions

## Tuesday 15 July

Room	Lecture room D	Lecture room E	Lecture room F
Topic	Quantum systems and quantum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
14:00 - 14:25	Jean Pierre GAZEAU	Andrew DOUGLAS	Jiri HRIVNAK
	Covariant integral quantizations	Levi decomposable algebras in the classical Lie algebras	Generalized Trigonometric Transforms of affine Weyl Groups
14:30 - 14:55	Piotr KIELANOWSKI	Libor SNOBL	Piergiulio TEMPESTA
	Bethe-Salpeter equation for unstable states	Classification and Identification of Lie Algebras	Formal Groups, Number Theory and Entropies
15:00 - 15:25	Véronique HUSSIN	Kishor Chandra PATI	Giuseppe GAETA
	Entanglement created with generalized squeezed coherent states through a beam splitter	Affine Kac-Moody Symmetric spaces associated with untwisted Kac-Moody algebras	Twisted symmetries of differential equations
15:30 - 16:00		Coffee Break	
Topic	Quantum systems and quan- tum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
16:00 - 16:25	Rodrigo FRESNEDA	Phillip ISAAC	Francis VALIQUETTE
	Some examples of covariant integral quantization	Characteristic identities for Lie (super)algebras	Group foliation of finite difference equations
16:30 - 16:55	Zouhair MOUAYN	lan MUSSON	Natig ATAKISHIYEV
	Coherent states quantization and formulae for the Berezin transform.	Shapovalov elements for basic simple Lie superalgebras.	On the raising and lowering difference operators for eigenvectors of the finite Fourier tansform
17:00 - 17:25	David J. FERNÁNDEZ	Elena POLETAEVA	Yousuke OHYAMA
	Painleve IV coherent states	On Kostant's theorem for the Lie superalgebra Q(n)	Meromorphic solutions to the q-Painlev'e equations around the origin
17:30 - 17:55	Ci LEI	Kevin COULEMBIER	Aleksander STRASBURGER
	Bifractional coherent states	Homological properties of category O	Hermite polynomials and representations of the unitary group

## Tuesday 5 July

Room	Lecture room G	Lecture room H	Lecture room I
Topic	Group theory in quantum information theory and quantum computation	Hopf algebras and quantum groups	Geometric mechanics and symmetry
14:00 - 14:25	Jiri TOLAR	Kenny DE COMMER	Eduardo MARTÍNEZ
	Finite quantum kinematics and their symmetries	Approximation properties for quantum groups	Connections and Euler- Lagrange equations on Lie al- gebroids
14:30 - 14:55	Andrei PATRASCU	Yinhuo ZHANG	Tom MESTDAG
	A quantum field theoretical approach to the P vs. NP problem via the sign of the fermionic Quantum Monte Carlo	Braided autoequivalences and quantum commutative bi-Galois objects	Homogeneity and Lagrangian systems
15:00 - 15:25	Alexis DE VOS	Ivan IP	Eduardo GARCÍA-TORAÑO AN- DRÉS
	On two subgroups of U(n), important for quantum computing	Positive representations and higher quantum Teichmüller Theory	Routh reduction, compatible transformations and stages
15:30 - 16:00		Coffee Break	
Topic	Statistical models, exact solu- tions	String theory, quantum gravity and conformal field theory	Integrable models and related topics
16:00 - 16:25	Michael MONASTYRSKY	David RIDOUT	John HARNAD
	Hecke Graphs, Ramanujan Graphs and Generalized Duality transformations for Lattice Spin Systems	Parabolic categories for bosonic ghost systems	2D Toda tau functions as combinatorial generating functions
16:30 - 16:55	Osamu SUZUKI	Ladislav HLAVATY	Oleg CHALYKH
	The method of Riemann-Hilbert problems for 3D-Ising model	Plane-parallel waves as duals of the flat background	KP hierarchy for a cyclic quiver
17:00 - 17:25	Julien RANDON-FURLING	Tamar FRIEDMANN	Jose Francisco GOMES
	Universality and time-scale invariance for the shape of planar Lévy processes	Enumeration of Vacua in String Theory via Algebraic Combina- torics	Backlund Transformation for mKdv Hierarchy
17:30 - 17:55		Felix REHREN	Charalampos EVRIPIDOU
		Finite groups and nonassocia- tivity in vertex algebras	A construction of generalized Lotka-Volterra systems con- nected with simple Lie algebras

## Wednesday 16 July

Room	Lecture room D	Lecture room E	Lecture room F
Topic	Quantum systems and quantum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
09:00 - 09:25	Richard KERNER	Tathagata BASAK	Maksym DEREVYAGIN
	Allan Solomon - In memoriam	Fundamental group of a mon- strous(?) discriminant comple- ment	Orthogonal polynomials and dressing chains
09:30 - 09:55	Karol PENSON	Jouko MICKELSSON	Vincent GENEST
	Allan I. Solomon: Some high- lights of his work in Mathemati- cal Physics	Projective families of Dirac operators on a Banach Lie groupoid	A Laplace-Dunkl equation on the 2-sphere and the Bannai-Ito algebra
10:00 - 10:30		Coffee Break	
10:30 - 10:55	Apostolos VOURDAS	Roy OSTE	Mariano A. DEL OLMO
	Quantum probabilities versus Kolmogorov probabilities and Bell inequalities	Unique characterization of the Fourier transform in the framework of representation theory	Lie groups, Jacobi polynomials and Wigner d-matrices
11:00 - 11:25	Laurence BOYLE	Alexander ELASHVILI	Sengul KURU
	Spin-orbit coupling in low- symmetry systems	Asymptotic behaviour of Lieandric numbers	Polynomial Symmetries of Classical and Quantum Spherical Lissajous Systems
11:30 - 12:30	Panel discussion: Recent advances and future challanges in group theoretical methods in physics (Lecture room D)		

## Wednesday 16 July

Room	Lecture room G	Lecture room H	Lecture room I
Topic		String theory, quantum gravity and conformal field theory	
09:00 - 09:25		Katrin WENDLAND	
		On Mathieu Moonshine	
09:30 - 09:55		Glenn BARNICH	
		Three dimensional gravity, holography and Virasoro coad- joint orbits	
10:00 - 10:30	Coffee break		
10:30 - 10:55		Karan GOVIL	
		Higher Spin Algebras in AdS5 and AdS7	
11:00 - 11:25		Dmitry GAL'TSOV	
		Rotating Taub-bolt instanton revisited	
11:30 - 12:30	Panel discussion: Recent advances and future challanges in group theoretical methods in physics (Lecture room D)		

## Thursday 17 July

Room	Lecture room D	Lecture room E	Lecture room F
Topic	Random matrix theory	Symmetries and group theory in biosciences	Wavelets / Group theory in many-body systems
13:00 - 13:25			
13:30 - 13:55			
14:00 - 14:25	Arno KUIJLAARS	Maia ANGELOVA	Franciszek SZAFRANIEC
	Products of random matrices	Complexity Analysis of Sleep Based on Non-Invasive Tech- niques	Bessel-to-Parseval via Julia dila- tions
14:30 - 14:55	Karl LIECHTY	Pierre-Philippe DECHANT	Kristina LAUNEY
	Nonintersecting paths on the circle and the tacnode process	Affine symmetry principles for non-crystallographic systems and applications to viruses and carbon onions	Emergent symmetries in atomic nuclei from first principles
15:00 - 15:25	Dong WANG	Bahruz GADJIEV	Walter SMILGA
	Fluctuations of TASEP and LPP with general initial data	Critical phenomena in small world networks	Momentum entanglement in relativistic quantum mechanics
15:30 - 16:00	Coffee Break		
Topic	Quantum systems and quantum mechanics	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
16:00 - 16:25	Ali MOSTAFAZADEH	Richard KERNER	Tom KOORNWINDER
	Dynamical Formulation of Scattering Theory and Unidirectional Invisibility	Z_3-splitting of quantum har- monic oscillator and ternary generalization of Heisenberg algebra	Okounkov's BC-type interpolation Macdonald polynomials and their q=1 limit
16:30 - 16:55	Pekka LAHTI	Chengming BAI	Galina FILIPUK
	Measurement uncertainty relations	Classical Yang-Baxter equation and some related structures	On the nonlinear differential equations
17:00 - 17:25	J. ZHENG-JOHANSSON	Stefan BERCEANU	Mahouton Norbert HOUNKON- NOU
	A Microscopic Theory of Neutron	On equations of motion on Siegel-Jacobi spaces generated by linear Hamiltonians in the generators of the Jacobi group	On some differential transformations of hypergeometric equations
17:30 - 17:55	Yossi STRAUSS	Rolf DAHM	Federico ZULLO
	Softening the edges of the Lax- Phillips scattering theory for quantum mechanics	On a Microscopic Representation of Spacetime	Properties of the series solutions for Painlevé transcendents: from P_IV to P_I through P_XXXIV

## Thursday 17 July

Room	Lecture room G	Lecture room H	Lecture room I
Topic	Clifford algebras, Clifford analysis and applications	Hopf algebras and quantum groups	Geometric mechanics and symmetry
13:00 - 13:25	Irene SABADINI		
	On the Bergman spaces of slice hyperholomorphic functions		
13:30 - 13:55	Amedeo ALTAVILLA		
	On the real differential of a slice regular function		
14:00 - 14:25	Cinzia BISI	Axel DE GOURSAC	Daisuke TARAMA
	The Schwarz-Pick Lemma for slice regular functions.	Quantum supergroups	Stability analysis for the free rigid body on U(n)
14:30 - 14:55	Nelson FAUSTINO	Atsuo KUNIBA	Yakov ITIN
	Hidden Symmetries in Discrete Clifford Analysis	Tetrahedron equations and quantum R matrices for q-oscillator representations	The constitutive tensor of linear elasticity: its decompositions, Cauchy relations, null Lagrangians, and wave propagation
15:00 - 15:25	Paula CEREJEIRAS	Thomas ERNST	Trevor REMPEL
	Riemann-Hilbert problems for discrete monogenic functions over the half space	q-Lie algebras and q- differential geometry united by examples	Generalizing the Classical Spinning Particle
15:30 - 16:00	Coffee break		
Topic	Clifford algebras, Clifford analysis and applications	String theory, quantum gravity and conformal field theory	Integrable models and related topics
16:00 - 16:25	Eckhard HITZER	Lee Peng TEO	Laszlo FEHER
	The orthogonal planes split of quaternions and its relation to quaternion geometry of rotations	Finite temperature Casimir interaction between spheres in higher dimensional spacetime	Recent developments in the reduction approach to actionangle dualities of integrable many-body systems
16:30 - 16:55	Giulia SARFATTI	Norisuke SAKAI	Michal MARVAN
	Invariant metrics associated with the quaternionic Hardy space	Neutral bions in the CP^{N-1} model	On symmetries and recursion operators of the Darboux Egoroff system
17:00 - 17:25	Fabrizio COLOMBO	Masashi HAMANAKA	Jing Ping WANG
	Spectral properties of quater- nionic linear operators	Noncommutative Instantons and Reciprocity	Representations of sl(2,C) in the BGG Category O and master symmetries
17:30 - 17:55		Valeriy DVOEGLAZOV	Pavle SAKSIDA
		Energy-Momentum Tensor in Electromagnetic Theory and Gravitation from Relativistic Quantum Equations.	On the nonlinear Fourier transform and its inverse

## Friday 18 July

Room	Lecture room D	Lecture room E	Lecture room F
Topic	Random matrix theory	Lie groups, Lie superalgebras, representation theory	Superintegrable and exact solvable systems, special functions, Lie symmetries
13:00 - 13:25			
13:30 - 13:55			
14:00 - 14:25	Venkata Krishna Brahmam KOTA	Enrico CELEGHINI	Francisco J. HERRANZ
	Group Theory for Embedded Random Matrix Ensembles: Open Problems	Special functions, Lie algebras and Quantum mechanics	An exactly solvable deformation of the Coulomb problem associated with the Taub-NUT metric
14:30 - 14:55	Max ATKIN	M. RAUSCH DE TRAUBENBERG	Irina STEPANOVA
	Critical Behaviour in Semi- classical Matrix Models and Painleve-Type Equations	Harmonic functions for unitary representations of three dimensional Lie groups on their parameter space	Lie symmetry analysis and exact solutions of thermodiffusion equations
15:00 - 15:25		Kurt Bernardo WOLF	Eugenio LEY KOO
		Position and momentum in the monochromatic Maxwell fisheye	Rotations of the most asymmetric molecules via 4-step and 1-step ladder operators
15:30 - 16:00	Coffee Break		
Topic	Quantum systems and quantum mechanics		
16:00 - 16:25	Arno BOHM  Boundary Conditions, Semi-		
	groups and the Quantum Arrow of Time		
16:30 - 16:55	Hai BUI		
	Relativistic Resonance and Decay Phenomena		
17:00 - 17:25	Birgit KAUFMANN		
	Re-gauging, symmetries and degeneracies for Graph Hamiltonians		
17:30 - 17:55	Vicente Said MORALES SALGADO		
	Supersymmetric partners of the truncated harmonic oscillator		
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## Friday 18 July

Room	Lecture room G	Lecture room H	Lecture room I
Topic	Clifford algebras, Clifford analysis and applications	Hopf algebras and quantum groups	Geometric mechanics and symmetry
13:00 - 13:25	Nele DE SCHEPPER		
	New results on the radially deformed Dirac operator		
13:30 - 13:55	Uwe KAEHLER		
	Clifford Analysis for fractional Dirac operators		
14:00 - 14:25	Swanhild BERNSTEIN	Gigel MILITARU	Fabian RADOUX
	Fractional powers of Riesz transforms and applications	Crossed products for non- commutative Poisson alge- bras. Applications	Higher symmetries of the conformal Laplacian
14:30 - 14:55	Roman LAVICKA	Ana AGORE	Yassir DINAR
	The Fischer decomposition of polynomials on superspace	Classifying split extensions of quantum groups	The equivalence of Drinfeld- Sokolov, bihamiltonian and Dirac reductions
15:00 - 15:25	Dalibor SMID	Ralph KAUFMANN	Goedele WAEYAERT
	Howe duality for polynomials on the superspace	Hopf algebras related to categorical structures and number theory	Lifted tensors and Hamilton- Jacobi separability
15:30 - 16:00	Coffee Break		
Topic	Clifford algebras, Clifford analysis and applications		Integrable models and related topics
16:00 - 16:25	Vladimir SOUCEK		Willy HEREMAN
	The reduction of symmetry and special solutions in Clifford analysis		Symbolic Computation of Conservation Laws of Nonlin- ear Partial Differential Equa- tions
16:30 - 16:55	Sirkka-Liisa ERIKSSON		Laurent DELISLE
	Cauchy Type of Theorem in Hyperbolic Function Theory		Constant surfaces associated to supersymmetric CP^{N-1} sigma models
17:00 - 17:25	Peter VAN LANCKER		Alfonso BLASCO-SANZ
	Eigenfunctions of the higher spin operator R_k^s on S^{m-1}		An integrable Hénon-Heiles system on the sphere and the hyperbolic plane
17:30 - 17:55	Tim RAEYMAEKERS		
	Higher spin operators as generators of transvector algebras		

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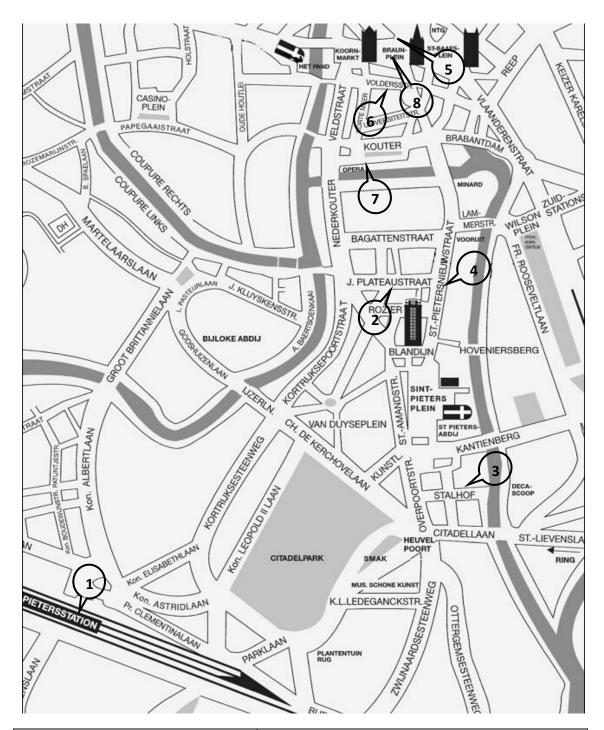
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1 Railway Station	5 City Hall (Welcome drink)
2 Conference site (Plateaustraat)	6 Aula (Weyl Prize and Wigner Medal Ceremony)
3 University Guest House	7 Handelsbeurs (Conference banquet)
4 De Brug (lunch)	8 City Pavilion (excursion)