

Proceedings of the
Conference on Harmonic Analysis

organized by the

Centre Universitaire de Luxembourg

and the

Université de Metz

9.9.2002 - 12.9.2002

Sponsors

Fonds National de la Recherche (Luxembourg)
Gouvernement Luxembourgeois
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Laboratoire de Mathématiques (MMAS) de l'Université de Metz
Région Lorraine
Ville de Metz

Preface

The present volume of "Travaux Mathématiques" collects some of the contributions to the international conference "Harmonic Analysis - Luxembourg/Metz" which was jointly organized by the Séminaire de mathématique du Centre Universitaire de Luxembourg and the Laboratoire de Mathématiques de l'Université de Metz, 9-12 September 2002.

This was the first workshop of this kind. Others are certainly to follow in the future, as such a meeting represents an excellent opportunity to establish links between the mathematical communities in Luxembourg and Metz.

The conference met a large resonance: 63 participants coming from 12 countries attended the conference and 25 talks were given (see the programme on the next pages and the abstracts at the end of the volume). The themes treated during the workshop covered most of the spectrum of the so-called non-commutative harmonic analysis, that is, analysis on non-abelian groups and group-like structures: analysis on symmetric spaces, representation theory and harmonic analysis on specific locally compact groups (amenable groups, compact groups, nilpotent Lie groups, discrete groups, Kazhdan's groups, p -adic groups ...), infinite dimensional Lie groups, von Neumann algebras, hypergroups...

The contributions submitted to this volume are the following. They all have been individually refereed.

- **V. Heiermann:** Spectral decomposition on a p -adic group
- **K.-H. Neeb:** Root graded Lie groups
- **D. Poguntke:** Synthesis properties of orbits of compact groups
- **J.-F. Quint:** Property (T) and exponential growth of discrete subgroups
- **G. Robertson :** Singular masas of von Neumann algebras : examples from the geometry of spaces of nonpositive curvature

Acknowledgments

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- Fonds National de la Recherche du Luxembourg

- Gouvernement Luxembourgeois
- Université de Metz
- Laboratoire de mathématiques de l'Université de Metz
- Région Lorraine
- Ville de Metz

We express our gratitude to all of them. We are grateful for the hospitality and the technical support of the

- Centre Universitaire de Luxembourg

and the

- Université de Metz

where the conference took place. We would also like to thank the speakers and participants: they are responsible for the success of the conference. Last but not least, we thank all the members and co-workers of the Centre Universitaire de Luxembourg, of the Société mathématique du Luxembourg and of the Laboratoire de mathématiques de l'Université de Metz for their help and assistance.

The organizers : **B. Bekka, J. Ludwig, C. Molitor–Braun, N. Poncin**

PROGRAMME

Monday, September 9 in Luxembourg

9h00-9h45 Welcome of the participants

9h45-10h00 Opening session

10h00-10h50 D. Müller (University of Kiel, Germany)

Bochner-Riesz means on the Heisenberg group and fractional integration on the dual

11h10-12h00 H. Fujiwara (Kinki University, Japan)

Inducing and restricting unitary representations of nilpotent Lie groups

14h00-14h50 C. Anantharaman-Delaroche (University of Orléans, France)

On spectral characterizations of amenability

15h10-16h00 V. Nekrashevych (University of Kiev, Ukraine)

Hilbert bimodules associated to self-similar group actions

16h30-17h20 G. Robertson (University of Newcastle, Australia)

Singular masses of von Neumann algebras : examples from the geometry of spaces of nonpositive curvature

Parallel sessions

17h40-18h10

N. Prudhon (University Louis Pasteur, Strasbourg, France)

Théorie des représentations et K -théorie

and

F. J. Gonzalez (University of Lausanne, Switzerland)

Fourier inversion on rank one compact symmetric spaces

Tuesday, September 10 in Luxembourg

9h00-9h50 A. Lubotzky (University of Jerusalem, Israel)

Ramanujan complexes

10h20-11h10 A. Valette (University of Neuchâtel, Switzerland)
Property (T) and harmonic maps

11h30-12h00 G. Litvinov (International Sophus Lie Center, Moscow, Russia)
Integral Geometry and hypergroups

14h00-14h50 J.-P. Anker (University of Orléans, France)
The heat kernel on symmetric spaces, fifteen years later

15h10-16h00 P. Torasso (University of Poitiers, France)
The Plancherel formula for almost algebraic groups

16h30-17h20 E. Damek (University of Wrocław, Poland)
Asymptotic behavior of the Poisson kernel on NA groups

Parallel sessions

17h40-18h10

H. Biller (University of Darmstadt, Germany)
Harish-Chandra decomposition of Banach-Lie groups
and

V. Heiermann (Humboldt University, Berlin, Germany)
Spectral decomposition and discrete series on a p -adic group

Wednesday, September 11 in Metz

Bus transfer from Luxembourg to Metz

14h00-14h50 J.-Y. Benoist (ENS Paris, France)
Divisible convex sets and prehomogeneous vector spaces

15h10-16h00 Y. Shalom (University of Jerusalem, Israel)
Harmonic analysis and the geometry of amenable groups

16h30-17h20 T. Steger (University of Sassari, Italy)
Free group representations and their realizations on the boundary

Parallel sessions

17h40-18h10 J.-F. Quint (ENS Paris, France)

Property (T) and exponential growth of discrete subgroups

and

J. Galindo (University Jaume I de Castellón, Spain)

Unitary duality, weak topologies and thin sets in locally compact groups

Thursday, September 12 in Metz

9h00-9h50 A.M. Vershik (University of St. Petersburg, Russia)

Harmonic analysis on the groups which are similar to infinite dimensional groups

10h20-11h10 K.-H. Neeb (University of Darmstadt, Germany)

Root graded Lie groups

11h30-12h20 Y. Neretin (University of Moscow)

Closures of quasiinvariant actions of infinite-dimensional groups, polymorphisms, and Poisson configurations

14h30-15h20 E. Kaniuth (University of Paderborn, Germany)

Extending positive definite functions from subgroups of locally compact groups

15h40-16h30 D. Poguntke (University of Bielefeld, Germany)

Synthesis properties of orbits of compact groups

List of participants

Mrs. Claire Anantharaman-Delaroche	Orléans, France
Mr. Yann Angeli	Nancy, France
Mr. Jean-Philippe Anker	Orléans, France
Mr. Didier Arnal	Dijon, France
Mr. Bachir Bekka	Metz, France
Mr. Yves Benoist	Paris, France
Mr. Harald Biller	Darmstadt, Germany
Mr. Marek Bozejko	Wroclaw, Poland
Mr. Dariusz Buraczewski	Wroclaw, Poland
Mr. Jean-Louis Clerc	Nancy, France
Mrs. Ewa Damek	Wroclaw, Poland
Mr. Antoine Derighetti	Lausanne, Switzerland
Mr. Jacek Dziubanski	Wroclaw, Poland
Mr. Hartmunt Führ	München, Germany
Mr. Hidenori Fujiwara	Kyushu, Japan
Mr. Jorge Galindo	Castellón, Spain
Mr. Helge Glöckner	Darmstadt, Germany
Mr. Raoul Gloden	Luxembourg, Luxembourg
Mr. Francisco J. Gonzalez	Lausanne, Switzerland
Mr. Volker Heiermann	Berlin, Germany
Mr. Andrzej Hulanicki	Wroclaw, Poland
Mrs. Junko Inoue	Tottori, Japan
Mr. Hideyuki Ishi	Yokohama, Japan
Mr. Eberhard Kaniuth	Paderborn, Germany
Mr. Guy Kass	Luxembourg, Luxembourg
Mr. Koufany Khalid	Nancy, France
Mr. Michael Leinert	Heidelberg, Germany
Mr. Grigori Litvinov	Moscow, Russia
Mr. Nicolas Louvet	Metz, France
Mr. Alex Lubotzki	Jerusalem, Israel
Mr. Jean Ludwig	Metz, France
Mr. Moshen Masmoudi	Metz, France
Mr. Christian Masse	Metz, France
Mrs. Carine Molitor-Braun	Luxembourg, Luxembourg
Mr. Raymond Mortini	Metz, France
Mr. Detlef Müller	Kiel, Germany

Mr. Karl-Hermann Neeb	Darmstadt, Germany
Mr. Volodia Nekrashevych	Kiev, Ukraine
Mr. Yuri A. Neretin	Moscow, Russia
Mr. Markus Neuhauser	Neuchâtel, Switzerland
Mr. Takaaki Nomura	Kyoto, Japan
Mr. Patrick Ostellari	Nancy, France
Mrs. Monique Peiffer	Luxembourg, Luxembourg
Mr. Detlev Poguntke	Bielefeld, Germany
Mr. Norbert Poncin	Luxembourg, Luxembourg
Mr. Nicolas Prudhon	Strasbourg, France
Mr. Jean-François Quint	Paris, France
Mr. Guyan Robertson	Newcastle, Australia
Mr. Jang Schiltz	Luxembourg, Luxembourg
Mr. Günter Schlichting	München, Germany
Mr. Laurent Scuto	Metz, France
Mr. Yehuda Shalom	Jerusalem, Israel
Mr. Yves Stalder	Neuchâtel, Switzerland
Mr. Tim Steger	Sassari, Italy
Mr. Aleksander Strasburger	Warsaw, Poland
Mr. Pierre Torasso	Poitiers, France
Mr. Bartosz Trojan	Wroclaw, Poland
Mr. Oliver Ungermann	Bielefeld, Germany
Mr. Roman Urban	Wroclaw, Poland
Mr. Alain Valette	Neuchâtel, Switzerland
Mr. Anatoly Vershik	St. Petersburg, Russia
Mr. Tilmann Wurzbacher	Metz, France
Mr. Jacek Zienkiewicz	Wroclaw, Poland