## **VOLUME 145**



2009

## Edited by

S. J. EDIXHOVEN University of Leiden B. J. J. MOONEN University of Amsterdam B. J. TOTARO University of Cambridge

© Foundation Compositio Mathematica

London Mathematical Society

## EDITORIAL BOARD

D. BAR-NATAN University of Toronto, ON, Canada

A. A. BEILINSON University of Chicago, IL, USA

M. BHARGAVA Princeton University, NJ, USA

P. BIRAN School of Mathematical Sciences, Tel-Aviv University, Israel

C. BREUIL Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France

J.-H. EVERTSE University of Leiden, The Netherlands

G. FALTINGS Max-Planck-Institut für Mathematik, Bonn, Germany

D. GAITSGORY Harvard University, Cambridge, MA, USA

E. GETZLER Northwestern University, Evanston, IL, USA

A. J. DE JONG Columbia University, NY, USA

M. M. KAPRANOV Yale University, CT, USA

B. KLEINER Courant Institute of Mathematical Sciences, NY, USA M. KONTSEVICH Institut des Hautes Études Scientifiques, Bures-sur-Yvette, France

E. LEICHTNAM CNRS and Mathematics Institute of Chevaleret, Paris, France

F. MERKL Ludwig-Maximilians-Universität München, Germany

S. MORI Kyoto University, Japan

B. C. NGÔ Université Paris-Sud, Orsay, France

E. M. OPDAM University of Amsterdam, The Netherlands

P. SARNAK Princeton University, NJ, USA

B. SIEBERT Universität Hamburg, Germany

D. VAN STRATEN Universität Mainz, Germany

Z. SZABÓ Princeton University, NJ, USA

C. VOISIN Université Pierre et Marie Curie, Paris, France

L. VRANCKEN Université de Valenciennes et du Hainaut-Cambrésis, Valenciennes, France

T. D. WOOLEY University of Bristol, UK



# Contents

Volume 145 (2009)

| ANDRUSKIEWITSCH, NICOLÁS and GARCÍA, GASTÓN ANDRÉS, Quantum subgroups of a simple quantum   |      |
|---|------|
| group at roots of one   | 476  |
| ARINKIN, D. and BORODIN, A., $\tau$ -function of discrete isomonodromy transformations and probability  | 747  |
| BARBASCH, DAN and CIUBOTARU, DAN, Whittaker unitary dual of affine graded Hecke algebras of type $E$  | 1563 |
| BERGER, TOBIAS, On the Eisenstein ideal for imaginary quadratic fields  | 603  |
| BIRKAR, CAUCHER, The Iitaka conjecture $C_{n,m}$ in dimension six   | 1442 |
| BLOMER, V., BRÜDERN, J. and DIETMANN, R., Sums of smooth squares  | 1401 |
| BLONDEL, CORINNE and STEVENS, SHAUN, Genericity of supercuspidal representations of $p$ -adic Sp <sub>4</sub><br>BORODIN, A., see Arinkin, D.                 | 213  |
| BOURQUI, DAVID, Produit eulérien motivique et courbes rationnelles sur les variétés toriques  | 1360 |
| BRINGMANN, KATHRIN, FOLSOM, AMANDA and ONO, KEN, <i>q</i> -series and weight 3/2 Maass forms<br>BRÜDERN, J., <i>see</i> Blomer, V.                            | 541  |
| BUAN, A. B., IYAMA, O., REITEN, I. and SCOTT, J., Cluster structures for 2-Calabi–Yau categories and<br>unipotent groups                                      | 1035 |
|   | 1055 |
| BUIUM, ALEXANDRU and POONEN, BJORN, Independence of points on elliptic curves arising from special points on modular and Shimura curves, II: local results    | 566  |
| BÜYÜKBODUK, KÂZIM, Stark units and the main conjectures for totally real fields   | 1163 |
| CARO, DANIEL, Log-isocristaux surconvergents et holonomie   | 1465 |
| CHAPDELAINE, HUGO, <i>p</i> -units in ray class fields of real quadratic number fields  | 364  |
| CIPERIANI, MIRELA, Tate–Shafarevich groups in anticyclotomic $\mathbb{Z}_p$ -extensions at supersingular primes   | 293  |
| CIUBOTARU, DAN, see Barbasch, Dan   |      |
| COLLIOT-THÉLÈNE, JEAN-LOUIS and XU, FEI, Brauer–Manin obstruction for integral points of<br>homogeneous spaces and representation by integral quadratic forms | 309  |
| DE FERNEX, TOMMASO and HACON, CHRISTOPHER D., Singularities on normal varieties   | 393  |
| DE GREGORIO, IGNACIO, MOND, DAVID and SEVENHECK, CHRISTIAN, Linear free divisors and Frobenius manifolds  | 1305 |
| DIETMANN, R., see Blomer, V.  |      |
| DIMITROV, MLADEN, On Ihara's lemma for Hilbert modular varieties  | 1114 |
| DRMOTA, MICHAEL, MAUDUIT, CHRISTIAN and RIVAT, JOËL, Primes with an average sum of digits   | 271  |
| ENTOV, MICHAEL and POLTEROVICH, LEONID, Rigid subsets of symplectic manifolds   | 773  |
| FINASHIN, S. and KHARLAMOV, V., On the deformation chirality of real cubic fourfolds  | 1277 |
| FOLSOM, AMANDA, see Bringmann, Kathrin  |      |
| GARCÍA, GASTÓN ANDRÉS, see Andruskiewitsch, Nicolás   |      |
| GATHMANN, ANDREAS, KERBER, MICHAEL and MARKWIG, HANNAH, Tropical fans and the moduli spaces of tropical curves  | 173  |
| GEER, NATHAN, PATUREAU-MIRAND, BERTRAND and TURAEV, VLADIMIR, Modified quantum dimensions and re-normalized link invariants                                   | 196  |
| GEISSER, THOMAS, The affine part of the Picard scheme   | 415  |
| GIBNEY, ANGELA, Numerical criteria for divisors on $\overline{M}_g$ to be ample   | 1227 |
| GYŐRY, K., HAJDU, L. and PINTÉR, Á., Perfect powers from products of consecutive terms in arithmetic progression  | 845  |
| HACON, CHRISTOPHER D., see de Fernex, Tommaso   |      |
| HAJDU, L., see Győry, K.  |      |
| HOWARD, BENJAMIN, Intersection theory on Shimura surfaces   | 423  |
| IGUSA, KIYOSHI, ORR, KENT, TODOROV, GORDANA and WEYMAN, JERZY, Cluster complexes via semi-<br>invariants  | 1001 |
|   |      |

 $\bigodot$  2009 Foundation Compositio Mathematica

#### Contents

| INGALLS, COLIN and THOMAS, HUGH, Noncrossing partitions and representations of quivers<br>IWANARI, ISAMU, The category of toric stacks  | 1533<br>718 |
|---|-------------|
| IYAMA, O., see Buan, A. B.  | 550         |
| KANG, SOON-YI, Mock Jacobi forms in basic hypergeometric series   | 553         |
| KATZARKOV, L., PANTEV, T. and TOËN, B., Algebraic and topological aspects of the schematization functor   | 633         |
| KEDLAYA, KIRAN S., Semistable reduction for overconvergent F-isocrystals, III: Local semistable<br>reduction at monomial valuations KERBER, MICHAEL, see Gathmann, Andreas  | 143         |
| KHARLAMOV, V., see Finashin, S.   |             |
| LAFFORGUE, VINCENT and LYSENKO, SERGEY, Geometric Weil representation: local field case<br>LYSENKO, SERGEY, <i>see</i> Lafforgue, Vincent   | 56          |
| MAO, ZHENGYU and RALLIS, STEPHEN, A Plancherel formula for $\text{Sp}_{2n}/\text{Sp}_n \times \text{Sp}_n$ and its application<br>MARKWIG, HANNAH, see Gathmann, Andreas<br>MAUDUIT, CHRISTIAN, see Drmota, Michael | 501         |
| MAULIK, DAVESH and OBLOMKOV, ALEXEI, Donaldson–Thomas theory of $\mathcal{A}_n \times \mathbf{P}^1$   | 1249        |
| MCMULLEN, CURTIS T., Uniformly Diophantine numbers in a fixed real quadratic field  | 827         |
| MOK, CHUNG PANG, The exceptional zero conjecture for Hilbert modular forms  | 1           |
| MOND, DAVID, see de Gregorio, Ignacio   |             |
| NAKAMURA, KENTARO, Classification of two-dimensional split trianguline representations of <i>p</i> -adic fields   | 865         |
| NEKOVÁŘ, JAN, On the parity of ranks of Selmer groups IV. With an appendix by Jean-Pierre Wintenberger  | 1351        |
| NOVIK, ISABELLA and SWARTZ, ED, Gorenstein rings through face rings of manifolds  | 993         |
| OBLOMKOV, ALEXEI, see Maulik, Davesh  |             |
| ONO, KEN, see Bringmann, Kathrin  |             |
| ORR, KENT, see Igusa, Kiyoshi   |             |
| PANTEV, T., see Katzarkov, L.   |             |
| PATUREAU-MIRAND, BERTRAND, see Geer, Nathan   |             |
| PINTÉR, Á., see Győry, K.   |             |
| POLTEROVICH, LEONID, see Entov, Michael   |             |
| POONEN, BJORN, see Buium, Alexandru   |             |
| RALLIS, STEPHEN, see Mao, Zhengyu   |             |
| REITEN, I., see Buan, A. B.   |             |
| RIVAT, JOËL, see Drmota, Michael  | 1081        |
| SAITO, TAKESHI, Hilbert modular forms and <i>p</i> -adic Hodge theory<br>SCHMIDT, TOBIAS, Analytic vectors in continuous <i>p</i> -adic representations   | 247         |
| SCHOEN, CHAD, Desingularized fiber products of semi-stable elliptic surfaces with vanishing third Betti   | 241         |
| number<br>SCOTT, J., see Buan, A. B.  | 89          |
| SEVENHECK, CHRISTIAN, see de Gregorio, Ignacio  |             |
| SORENSEN, CLAUS M., Level-raising for Saito–Kurokawa forms  | 915         |
| STEVENS, SHAUN, see Blondel, Corinne  | 0.20        |
| STROPPEL, CATHARINA, Parabolic category $\mathcal{O}$ , perverse sheaves on Grassmannians, Springer fibres and Khovanov homology  | 954         |
| SWARTZ, ED, see Novik, Isabella   |             |
| THOMAS, HUGH, see Ingalls, Colin  |             |
| TODOROV, GORDANA, see Igusa, Kiyoshi  |             |
| TOËN, B., see Katzarkov, L.   |             |
| TREUMANN, DAVID, Exit paths and constructible stacks  | 1504        |
| TURAEV, VLADIMIR, see Geer, Nathan  |             |
| VIDAL, ISABELLE, Formule du conducteur pour un caractère $l$ -adique  | 687         |
| WEYMAN, JERZY, see Igusa, Kiyoshi   |             |
| WILDESHAUS, JÖRG, Chow motives without projectivity   | 1196        |

### Contents

| WINTENBERGER, JEAN-PIERRE, see Nekovář, Jan  |      |
|--|------|
| XU, FEI, see Colliot-Théléne, Jean-Louis   |      |
| YEGANEFAR, NADER, On manifolds with quadratic curvature decay  | 528  |
| YOSHIOKA, KŌTA, Stability and the Fourier–Mukai transform II   | 112  |
| YUAN, XINYI, On volumes of arithmetic line bundles   | 1447 |
| YUAN, XINYI, ZHANG, SHOU-WU and ZHANG, WEI, The Gross–Kohnen–Zagier theorem over totally real fields | 1147 |
| ZHANG, SHOU-WU, see Yuan, Xinyi  |      |
| ZHANG, WEI, see Yuan, Xinyi  |      |



**Ownership and Publication of** *Compositio Mathematica*. The journal was founded in 1934 and has been owned since 1950 by the Foundation Compositio Mathematica. The Board members of this Dutch foundation are all mathematicians; its President is Prof. J. H. M. Steenbrink of Nijmegen University. Papers are submitted to the journal's Dutch editorial office, currently based in the Korteweg–de Vries Institute at the University of Amsterdam. Since January 2004, the journal has been published on behalf of the Foundation by the London Mathematical Society (LMS). The LMS is the major British learned Society for mathematics and publishes ten other journals, five of which are in collaboration with other learned societies. Cambridge University Press prints and distributes *Compositio Mathematica* under agreement with the London Mathematical Society.

For further information concerning the journal's ownership, management and pricing policy, please contact the *Publisher*, Dr Susan Hezlet, at the London Mathematical Society (susan.hezlet@lms.ac.uk).

**Submission of Manuscripts.** *Compositio Mathematica* prefers the submission of papers in LaTeX; however, papers submitted in TeX, AMSTeX, LAMSTeX and for conventional typesetting can also be accepted.

Guidelines for electronic submission are available from the Compositio Mathematica website at http://www.compositio.nl. Hard-copy submissions should be sent by post, in duplicate, to B. J. J. Moonen, *Managing Editor*, Compositio Mathematica, Korteweg–de Vries Institute, University of Amsterdam, P. O. Box 94248, NL-1090 GE Amsterdam, The Netherlands, and should be accompanied by a covering letter stating the title of the paper, the names of all authors and the full address details of the corresponding author (including an email address).

The eventual supply of an accepted-for-publication paper in its final form as a LaTeX file will ensure more rapid publication.

**Instructions for the Preparation of Manuscripts** can be found on the *Compositio Mathematica* website at http://www.compositio.nl and can be requested directly from the *Managing Editor* at the address given above.

**Rights and Permissions.** Authors are asked to assign an exclusive licence to the Foundation Compositio Mathematica for the publication of their work. Enquiries regarding rights and permission to reproduce works should be addressed to the *Publisher*, London Mathematical Society, De Morgan House, 57–58 Russell Square, London WC1B 4HS, UK.

**Offprints.** A URL giving free access to the final published article will be provided free of charge. Alternatively, 50 offprints free of charge and additional offprints can be ordered on the form which will accompany the page proofs.

**Back numbers.** Orders for Volume 140 onwards should be sent to Cambridge University Press. Enquiries about previous volumes should be directed to the *Publisher*, London Mathematical Society.

Typeset by Sunrise Setting Ltd, Torquay, UK. Printed in the United Kingdom at the Cambridge University Press, Cambridge.



VOLUME 145 NUMBER 6 NOVEMBER 2009

| Jan Nekovář On the parity of ranks of Selmer groups IV. With an appendix by Jean-Pierre Wintenberger            | 1351–1359 |
|---|-----------|
| <b>David Bourqui</b> Produit eulérien motivique et courbes rationnelles sur les variétés toriques               | 1360–1400 |
| V. Blomer, J. Brüdern and R. Dietmann Sums of smooth squares  | 1401–1441 |
| <b>Caucher Birkar</b> The litaka conjecture $C_{n,m}$ in dimension six  | 1442–1446 |
| Xinyi Yuan On volumes of arithmetic line bundles  | 1447–1464 |
| Daniel Caro Log-isocristaux surconvergents et holonomie   | 1465–1503 |
| David Treumann Exit paths and constructible stacks  | 1504–1532 |
| <b>Colin Ingalls</b> and <b>Hugh Thomas</b> Noncrossing partitions and representations of quivers               | 1533–1562 |
| <b>Dan Barbasch</b> and <b>Dan Ciubotaru</b> Whittaker unitary dual of affine graded Hecke algebras of type $E$ | 1563–1616 |
| Contents of volume 145  |           |

© Foundation Compositio Mathematica

Cambridge Journals Online For further information about this journal please go to the journal website at: journals.cambridge.org/com



The London Mathematical Society



https://doi.org/10.1112/S0010437X09000128 Published online by Cambridge University Press