

RESEARCH PAPERS AND BOOKS

Lisa Carbone

Refereed journal articles and preprints

- [51] Bass, Hyman, Carbone, Lisa, Lai, Yvonne *Interview with Hyman Bass*, Notices Amer. Math. Soc. 72 (2025), no. 6, 653–665. <https://arxiv.org/pdf/2502.09751>
- [50] Carbone, L., Jurisich, E. and Murray, S. H. *A Lie group analog for the Monster Lie algebra*, Submitted (2025), arXiv:2311.11078v1 [math.RT] <https://arxiv.org/pdf/2311.11078>
- [49] Ali, A. and Carbone, L., *Eisenstein series on rank 2 Kac–Moody groups over finite fields*, Submitted (2025), <https://arxiv.org/pdf/2108.02919.pdf>
- [48] L. Carbone, T. Coelho, S. H. Murray, F. Thurman and S. Zhu *Growth of root multiplicities along imaginary root strings in Kac–Moody algebras*, To appear, Communications in Algebra (2025), arXiv:2403.01687v1 [math.RT]
- [47] Ali, A., Carbone, L., Jurisich, E. and Murray, S. H. *Prosummability In Kac–Moody groups*, To appear, Contemporary Math (2025)
- [46] Carbone, L. and Jurisich, E. *A Magnus Group construction for a class of Borcherds algebras*, To appear, Contemporary Math (2025)
- [45] Carbone, L. *Symmetries of Borcherds algebras*, To appear, Contemporary Math (2025)
- [44] Ali, A., Carbone, L. and Murray, S. H. *Chevalley groups over \mathbb{Z} - a representation theoretic approach*, European Journal of Math, (2025), no. 1, Paper No. 11, arXiv:2408.16895v1 [math.RT] <https://arxiv.org/pdf/2408.16895>
- [43] Darlayne Addabbo, Lisa Carbone, Elizabeth Jurisich, Maryam Khaqan and Scott H. Murray, *Vertex operators for imaginary \mathfrak{gl}_2 -subalgebras in the Monster Lie Algebra*, J. Pure Appl. Algebra 228 (2024), no.7, Paper No. 107651, 25 pp., arXiv:2210.16178v1 [math.RT] <https://arxiv.org/pdf/2210.16178>
- [42] Abid Ali, Lisa Carbone, Dongwen Liu, Scott H. Murray, *Strong integrality of inversion subgroups of Kac–Moody groups*, J. Lie Theory 34 (2024), no.2, 453–468, arXiv:2210.01644v1 [math.RT] <https://arxiv.org/pdf/2210.01644>
- [41] Carbone, L., Garland, H., Lee, K-H, Liu D. and Miller, S. D. *On the convergence of Kac–Moody Eisenstein series*, American Journal of Mathematics, Volume 146, Number 5, October pp. 1253-1274 (2024), arXiv:2005.13636v1 [math.NT] <https://arxiv.org/pdf/2005.13636>
- [40] Carbone, L. and Paquette, N. *Imaginary reflections and discrete symmetries in the Heterotic Monster*, Preprint (2022), arXiv:2202.09720v3 [hep-th] <https://arxiv.org/pdf/2202.09720>
- [39] Carbone, L., Jurisich, E. and Murray, S. H. *Constructing a Lie group analog for the Monster Lie algebra*, Lett. Math. Phys. 112 (2022), no. 3, Paper No. 43, 16 pp, arXiv:2002.06658v1 [math.RT] <https://arxiv.org/pdf/2002.06658>
- [38] Carbone, L., Lee, K.-H. and Liu, D. *Entirety of cuspidal Eisenstein series on Kac–Moody groups*, Algebra Number Theory 16 (2022), no. 5, 1099–1119, arXiv:2008.11559 [math.NT][math.RT] <https://arxiv.org/pdf/2008.11559>
- [37] Lisa Carbone, K. N. Raghavan, Biswajit Ransingh, Krishanu Roy, Sankaran Viswanath, *π -systems of symmetrizable Kac–Moody algebras*, Lett. Math. Phys. 111 (2021), no. 1, 5. arXiv:1902.06413v1 [math.RA] <https://arxiv.org/pdf/1902.06413>
- [36] Carbone, L., Kownacki, M., Murray, S. H. and Srinivasan, S. *Commutation relations and structure constants for rank 2 Kac–Moody algebras*, Journal of Algebra, Volume 566, (2021), Pages 443–476 arXiv:1804.02308 <https://arxiv.org/pdf/1804.02308>
- [35] Carbone, L., Nanda, V. and Naqvi, Y. *Equivariant simplicial reconstruction*, SIAM J. Appl. Algebra Geom. 4 (2020), no. 4, 532–552 arXiv:1807.09396 <https://arxiv.org/pdf/1807.09396>
- [34] Carbone, L., Feingold, A. J. and Freyn, W. *A lightcone embedding of the twin building of a hyperbolic Kac–Moody group*, SIGMA 16 (2020), 045, 47 pages, arXiv:1606.05638v2 [math.GR] <https://arxiv.org/pdf/1606.05638>
- [33] Carbone, L., Cederwall, M. and Palmkvist, J. *Generators and relations for Lie superalgebras of Cartan type*, Journal of Physics A: Mathematical and Theoretical, Volume 52, Number 5, January 2019, arXiv:1802.05767v1 [math.RT] <https://arxiv.org/pdf/1807.09396>

- [32] Carbone, L., Cederwall, M. and Palmkvist, J. *Generators and relations for (generalised) Cartan type superalgebras*, J. Phys. Conf. Ser. 1194 (2019) no.1, 012020, arXiv:1812.03068v2 [math.RT] <https://arxiv.org/pdf/1812.03068>
- [31] Carbone, L. and Wagner, F. *Uniqueness of representation-theoretic hyperbolic Kac–Moody groups over \mathbb{Z}* , Contemporary Math, Conference on Lie Algebras, Vertex Operator Algebras, and Related topics, edited by K. Barron, E. Jurisich, H. Li, A. Milas and K. C. Misra, (2016), arXiv:1512.04623, 51–64, Contemp. Math., 695, Amer. Math. Soc., Providence, RI, 2017 <https://arxiv.org/pdf/1512.04623>
- [30] Bao, L. and Carbone, L. *Kac–Moody groups and automorphic forms in low dimensional supergravity theories*, Conference on Lie Algebras, Vertex Operator Algebras, and Related topics, edited by K. Barron, E. Jurisich, H. Li, A. Milas and K. C. Misra, (2016), Contemp. Math., 695, 29–40, Amer. Math. Soc., Providence, RI, 2017, arXiv:1602.02319 <https://arxiv.org/pdf/1602.02319>
- [29] Allcock, D. and Carbone, L. *Finite presentation of hyperbolic Kac–Moody groups over rings*, J. Algebra 445, 232–243, (2016), arXiv:1409.5918 <https://arxiv.org/pdf/1409.5918>
- [28] Ali, A and Carbone, L *Congruence subgroups of lattices in rank 2 Kac–Moody groups over finite fields*, Communications in Algebra, Volume 44, Issue 3, (2016), 1236–1264 <https://sites.math.rutgers.edu/~carbonel/pdfs/ACsubmission.pdf>
- [27] Carbone, L., Murray, S. H. and Sati, H. *Integral group actions on symmetric spaces and discrete duality symmetries of supergravity theories*, J. Math. Phys. 56, no. 10, 103501, 26 pp. (2015) arXiv:1407.3370 <https://arxiv.org/pdf/1407.3370>
- [26] Carbone, L., Conway, A., Freyn, W. and Penta, D. *Weyl group orbits on Kac–Moody root systems*, J. Phys. A: Math. Theor. 47 445201, (2014) arXiv:1407.3375 <https://arxiv.org/pdf/1407.3375>
- [25] Carbone, L., Freyn, W and Lee, K.–H. *Dimensions of Imaginary Root Spaces of Hyperbolic Kac–Moody Algebras*, In ‘Recent Advances in Representation Theory, Quantum Groups, Algebraic Geometry, and Related Topics’: Vol 623 of Contemporary Mathematics, Ed: Pramod et al, AMS (2014) <https://arxiv.org/pdf/1305.3318>
- [24] Carbone, L., Lee, K.–H. and Liu, D. *Eisenstein series on rank 2 hyperbolic Kac–Moody groups over \mathbb{R}* Math. Annalen pp 1–25 (2016), arXiv:1306.3280 <https://arxiv.org/pdf/1306.3280>
- [23] Carbone, L, Rips, E *Reconstructing group actions*, IJAC, Volume No. 23, Issue No. 2, 255–323 (2013) <https://www.worldscientific-com.proxy.libraries.rutgers.edu/doi/abs/10.1142/S021819671340002X>
- [22] Carbone, L, Kangaslampi, R and Vdovina, A *Groups acting simply transitively on hyperbolic buildings*, LMS Journal of Computation and Mathematics, Vol 15, 101–112 (2012) <https://arxiv.org/pdf/1107.3690>
- [21] Carbone, L, Cobbs, C and Rosenberg, G *Tree lattice subgroups*, Groups Complex. Cryptol. 3, No. 1, (2011) 1–23 <https://www-degruyterbrill-com.proxy.libraries.rutgers.edu/document/doi/10.1515/gcc.2011.001/html>
- [20] Carbone, L and Cobbs, C *Infinite descending chains of cocompact lattices in Kac–Moody groups*, Journal of Algebra and Its Applications Vol 10, No. 6, 1–33 (2011) <https://sites.math.rutgers.edu/~carbonel/pdfs/CCobbs.pdf>
- [19] Carbone, L and Naqvi, Y *Hyperbolic Kac–Moody Weyl groups, billiard tables and actions of lattices on trees*, Journal of Pure and Applied Algebra Vol 213 No. 3, 495–518 (2012) <https://sites.math.rutgers.edu/~carbonel/pdfs/Tessellations.pdf>
- [18] Andersen, K., Carbone, L. and Penta, D. *Kac–Moody Fibonacci sequences, hyperbolic golden ratios, and real quadratic fields*, Journal of Number Theory and Combinatorics Vol Vol 2, No. 3, 245–278 (2011) <https://sites.math.rutgers.edu/~carbonel/pdfs/ACP.pdf>
- [17] Carbone, L, Cobbs, C and Murray, S *Fundamental domains for congruence subgroups of SL_2 in positive characteristic*, Journal of Algebra Vol 325 431–439 (2011) <https://arxiv.org/pdf/0909.0062>
- [16] Carbone, L., Chung, S., Cobbs, L., McRae, R., Nandi, D., Naqvi Y. and Penta, D. *Classification of hyperbolic Dynkin diagrams, root lengths and Weyl group orbits*, Journal of Physics. A: Math. Theor. 43 155209, (2010) <https://arxiv.org/pdf/1003.0564>
- [15] Carbone, L, Ershov, M and Ritter, G *Abstract simplicity of complete Kac–Moody groups over finite fields*, Journal of Pure and Applied Algebra (2008) Vol 212, 2147–2162 <https://arxiv.org/pdf/math/0612772>
- [14] Carbone, L and Ciobanu, L *Characterization of Non-minimal Tree Actions*, Revue Roumaine de Mathematiques Pures et Appliquees, (Romanian Journal of Pure and Applied Mathematics) Vol 52 No. 4, (2007) 377–388 https://imar.ro/journals/Revue_Mathematique/volumes.html
- [13] Carbone, L and Clark, D *Bass–Tits Minimization of Automata, Quotients of Trees and Diameters*, Journal of Pure and Applied Algebra Vol 204 (2), 300–316 (2006) <https://www-sciencedirect-com.proxy.libraries.rutgers.edu/science/article/pii/S0022404905000848?via%3Dihub>
- [12] Carbone, L *Non-minimal Tree Actions and the Existence of Non-uniform Tree Lattices*, Bulletin of the Australian Mathematical Society, Vol 70 257–266 (2004) <https://sites.math.rutgers.edu/~carbonel/pdfs/NonMinimal.pdf>

- [11] Carbone, L and Garland, H *Existence of Lattices in Kac–Moody Groups over Finite Fields*, Communications in Contemporary Math, Vol 5, No.5, 813–867 (2003) <https://sites.math.rutgers.edu/~carbone1/pdfs/KacMoodyLattices.pdf>
- [10] Carbone, L and Rosenberg, G *Lattices on Non-uniform Trees*, Geometriae Dedicata Vol 98, 161–188 (2003) <https://sites.math.rutgers.edu/~carbone1/pdfs/LatticesOnNonUnifTrees.pdf>
- [9] Carbone, L *The Tree Lattice Existence Theorems* Comptes Rendus de l’Academie des Sciences. Serie I, Mathematique, 335 223–228 (2002) <https://www.sciencedirect.com/science/article/pii/S1631073X02024743>
- [8] Carbone, L and Clark, D *Lattices on Parabolic Trees*, Communications in Algebra, Vol. 30, Issue 4, 1853–1886 (2002) <https://www.tandfonline.com/doi/pdf/10.1081/AGB-120013221>
- [7] Carbone, L and Rosenberg, G *Infinite Towers of Tree Lattices*, Mathematical Research Letters Vol 8, 1–10 (2001) <https://sites.math.rutgers.edu/~carbone1/pdfs/LatticesOnNonUnifTrees.pdf>
- [6] Carbone, L and Garland, H *Lattices in Kac–Moody Groups*, Mathematical Research Letters Vol 6, 439–447 (1999) <https://link.intlpress.com/JDetail/1806606851624038401>
- [5] Carbone, L *Constructing Tree Lattices*, Algebras and Combinatorics. An International Congress, ICAC ’97, Hong Kong (edited by K. P. Shum, and E. Taft) 63–97, Springer (1999) <https://search.worldcat.org/th/title/algebras-and-combinatorics-an-international-congress-icac97-hong-kong/oclc/40964782>

Books

- [4] Carbone, L *Non-uniform Lattices on Uniform Trees*, Memoirs of the AMS, vol. 152, no. 724, 127 pages, ISBN 0821827219 (2001) https://books.google.com/books/about/Non_Uniform_Lattices_on_Uniform_Trees.html?hl=ar&id=qjNavgEACAAJ

Chapters in Books

- [3] Bass, H, Carbone, L, and Rosenberg, G *The Existence Theorem for Tree Lattices*, Appendix [BCR] in ‘*Tree Lattices*’ by Hyman Bass and Alex Lubotzky Progress in Mathematics 176, Birkhauser, Boston, 167–184 (2000) <https://sites.math.rutgers.edu/~carbone1/pdfs/AppendixBCR.pdf>
- [2] Carbone, Lisa and Goddard, Wayne, *Characterizations and Types of Trees*, Handbook of Discrete and Combinatorial Mathematics. Ed. Kenneth H. Rosen. Boca Raton. CRC Press. (2016) https://api.pageplace.de/preview/DT0400.9781584887812_A31471053/preview-9781584887812_A31471053.pdf
- [1] Carbone, Lisa, *A filtration of the chain complex of a rewriting system*, in ‘Geometric and computational perspectives on infinite groups’, Ed. G. Baumslag, D. B. A. Epstein, R. Gilman, H. B. Short, and C. C. Sims. New Brunswick, NJ, 9–26, DIMACS Ser. Discrete Math. Theoret. Comput. Sci., 25, Amer. Math. Soc., Providence, RI, (1996). <http://dimacs.rutgers.edu/archive/Volumes/Vol25.html>

Other notes and preprints

Root subsystems of rank 2 hyperbolic root systems, Lisa Carbone, Matt Kownacki, Scott H. Murray, Sowmya Srinivasan <https://arxiv.org/pdf/1506.05405>

Sphere packings, lattices, groups and infinite dimensional algebra, Open problems and discussion, <http://www.aimath.org/WWN/spherepacking/spherepacking.pdf>

On the Classification of Rank 1 Groups Over Non-archimedean Local Fields, Lisa Carbone <http://www.math.rutgers.edu/~carbone1/>

Mathematics education

Johnson, E., Weber, K., Fukawa-Connelly, T., Mahmoudian, H., and Carbone, L. *Collaborating with mathematicians to use active learning in university mathematics courses: The importance of attending to mathematicians obligations*, Educ Stud Math 119, 145161 (2025). <https://doi.org/10.1007/s10649-024-10381-x>

Blackwell, S., Carbone, L., Katzen, S., Mejía Ramos, J. P., Ptak, C., Sandberg, A., and Seneres, A. *Impact of active learning on course performance and self-reported learning gains in a proof-based mathematics course*, 4th Northeastern Conference on Research in Undergraduate Mathematics Education.