

# Leonid Petrov. Publication List

## Preprints (\*), accepted, or published works

- [49] (\*) Alisa Knizel, Leonid Petrov. *Random Lozenge Waterfall: Dimensional Collapse of Gibbs Measures*, [arXiv:2507.22011 \[math.PR\]](#). ([PDF link](#)). 65 pages.
- [48] (\*) Alexey Bufetov, Leonid Petrov, Panagiotis Zografos. *Domino Tilings of the Aztec Diamond in Random Environment and Schur Generating Functions*, [arXiv:2507.08560 \[math.PR\]](#). ([PDF link](#)). 33 pages.
- [47] (\*) Leonid Petrov, Jeanne Scott. *Random Fibonacci Words via Clone Schur Functions*, [arXiv:2412.21126 \[math.PR\]](#). ([PDF link](#)). 71 pages.
- [46] (\*) Greta Panova, Leonid Petrov. *Hook-length Formulas for Skew Shapes via Contour Integrals and Vertex Models*, [arXiv:2409.17842 \[math.CO\]](#). ([PDF link](#)). 33 pages.
- [45] Alejandro H. Morales, Greta Panova, Leonid Petrov, Damir Yeliussizov. *Grothendieck Shenanigans: Permutons from Pipe Dreams via Integrable Probability*, **Advances in Mathematics**, **480** (2025), Part C, [110510](#). FPSAC 2025 poster. [arXiv:2407.21653 \[math.PR\]](#). ([PDF link](#)). 50 pages.
- [44] Amol Aggarwal, Matthew Nicoletti, Leonid Petrov. *Colored Interacting Particle Systems on the Ring: Stationary Measures from Yang–Baxter Equation*, **Compositio Math.** **161** (2025), no. 8, [1855–1922](#). [arXiv:2309.11865 \[math.PR\]](#). ([PDF link](#)). 73 pages.
- [43] Svetlana Gavrilova, Leonid Petrov. *Tilted biorthogonal ensembles, Grothendieck random partitions, and determinantal tests*, **Selecta Math.** (2024), Volume 30, article 56. [arXiv:2305.17747 \[math.PR\]](#). ([PDF link](#)). 47 pages.
- [42] Leonid Petrov, Mikhail Tikhonov. *Asymptotics of noncolliding  $q$ -exchangeable random walks*, **J. Phys. A: Math. Theor.** **56** [365203](#). [arXiv:2303.02380 \[math.PR\]](#). ([PDF link](#)). 34 pages.
- [41] Leonid Petrov, Axel Saenz. *Rewriting History in Integrable Stochastic Particle Systems*, **Commun. Math. Phys.**, **405** (300), 2024. [arXiv:2212.01643 \[math.PR\]](#). ([PDF link](#)). 76 pages.
- [40] Leonid Petrov. *Noncolliding Macdonald walks with an absorbing wall*, **SIGMA** **18** (2022), [079, 21 pages](#). [arXiv:2204.09206 \[math.PR\]](#). ([PDF link](#)). 21 pages.
- [39] Matthew Nicoletti, Leonid Petrov. *Irreversible Markov Dynamics and Hydrodynamics for KPZ States in the Stochastic Six Vertex Model*, **Electronic Journal of Probability** **2023**, Vol. 28, paper no. 138, 1–55.. [arXiv:2201.12497 \[math.PR\]](#). ([PDF link](#)). 59 pages.

- [38] Amol Aggarwal, Alexei Borodin, Leonid Petrov, Michael Wheeler. *Free Fermion Six Vertex Model: Symmetric Functions and Random Domino Tilings*, **Selecta Math.**, **29**, article **36** (2023). [arXiv:2109.06718 \[math.PR\]](#). ([PDF link](#)). 138 pages.
- [37] Leonid Petrov. *Refined Cauchy identity for spin Hall-Littlewood symmetric rational functions*, **Journal of Combinatorial Theory Ser. A**, vol. **184** (2021), **105519**. [arXiv:2007.10886 \[math.CO\]](#). ([PDF link](#)). 40 pages.
- [36] Matteo Mucciconi, Leonid Petrov. *Spin  $q$ -Whittaker polynomials and deformed quantum Toda*, **Communications in Mathematical Physics**, **389**, pages **1331-1416** (2022). [arXiv:2003.14260 \[math.PR\]](#). ([PDF link](#)). 86 pages.
- [35] Leonid Petrov, Mikhail Tikhonov. *Parameter symmetry in perturbed GUE corners process and reflected drifted Brownian motions*, **Journal of Statistical Physics**, **181** (2020), **1996-2010**. [arXiv:1912.08671 \[math.PR\]](#). ([PDF link](#)). 15 pages.
- [34] Leonid Petrov. *Parameter permutation symmetry in particle systems and random polymers*, **SIGMA** **17** (2021), **021**, **34** pages. [arXiv:1912.06067 \[math.PR\]](#). ([PDF link](#)). 34 pages.
- [33] Leonid Petrov. *PushTASEP in inhomogeneous space*, **Electronic Journal of Probability**, vol. **25** (2020), paper no. **114**. [arXiv:1910.08994 \[math.PR\]](#). ([PDF link](#)). 26 pages.
- [32] Leonid Petrov, Axel Saenz. *Mapping TASEP back in time*, **Probability Theory and Related Fields**, **182**, pages **481-530** (2022). [arXiv:1907.09155 \[math.PR\]](#). ([PDF link](#)). 50 pages.
- [31] Alexey Bufetov, Matteo Mucciconi, Leonid Petrov. *Yang-Baxter random fields and stochastic vertex models*, **Advances in Mathematics** **388** (2021), **107865**. [arXiv:1905.06815 \[math.PR\]](#). ([PDF link](#)). 94 pages.
- [30] Ivan Corwin, Konstantin Matveev, Leonid Petrov. *The  $q$ -Hahn PushTASEP*, **International Mathematics Research Notices** (2019), **rnz106**. [arXiv:1811.06475 \[math.PR\]](#). ([PDF link](#)). 40 pages.
- [29] Alisa Knizel, Leonid Petrov, Axel Saenz. *Generalizations of TASEP in discrete and continuous inhomogeneous space*, **Communications in Mathematical Physics** **372** (2019), no. **3**, pp **797-864**. [arXiv:1808.09855 \[math.PR\]](#). ([PDF link](#)). 68 pages.
- [28] Christian Gromoll, Mark Meckes, Leonid Petrov. *Quenched Central Limit Theorem in a Corner Growth Setting*, **Electronic Communications in Probability** (2018), Vol. **23**, paper no. **101**, **1-12**. [arXiv:1804.04222 \[math.PR\]](#). ([PDF link](#)). 12 pages.
- [27] Alexey Bufetov, Leonid Petrov. *Yang-Baxter field for spin Hall-Littlewood symmetric functions*, **Forum of Mathematics Sigma** **7** (2019), e39. [arXiv:1712.04584 \[math.PR\]](#). ([PDF link](#)). 70 pages.
- [26] Michael Damron, Leonid Petrov, David Sivakoff. *Coarsening model on  $Z^d$  with biased zero-energy flips and an exponential large deviation bound for ASEP*, **Communications in**

- Mathematical Physics** **362** (2018), no. 1, 185-217. [arXiv:1708.05806 \[math.PR\]](#). (PDF link). 33 pages.
- [25] Sevak Mkrtchyan, Leonid Petrov. *GUE corners limit of  $q$ -distributed lozenge tilings*, **Electronic Journal of Probability**, Volume 22 (2017), paper no. 101, 24 pp. [arXiv:1703.07503 \[math.PR\]](#). (PDF link). 24 pages.
- [24] Alexei Borodin, Leonid Petrov. *Inhomogeneous exponential jump model*, **Probability Theory and Related Fields** **172** (2018), 323-385. [arXiv:1703.03857 \[math.PR\]](#). (PDF link). 63 pages.
- [23] Daniel Orr, Leonid Petrov. *Stochastic higher spin six vertex model and  $q$ -TASEPs*, **Advances in Mathematics** **317** (2017), 473-525. [arXiv:1610.10080 \[math.PR\]](#). (PDF link). 53 pages.
- [22] Vadim Gorin, Leonid Petrov. *Universality of local statistics for noncolliding random walks*, **Annals of Probability** (2019), Vol. 47, No. 5, 2686-2753. [arXiv:1608.03243 \[math.PR\]](#). (PDF link). 68 pages.
- [21] Alexei Borodin, Leonid Petrov. *Lectures on Integrable probability: Stochastic vertex models and symmetric functions*, **Lecture Notes of the Les Houches Summer School, Volume 104, July 2015**. [arXiv:1605.01349 \[math.PR\]](#). (PDF link). 113 pages.
- [20] Alexei Borodin, Leonid Petrov. *Higher spin six vertex model and symmetric rational functions*, **Selecta Mathematica** **24** (2018), no. 2, 751-874. [arXiv:1601.05770 \[math.PR\]](#). (PDF link). 124 pages.
- [19] Konstantin Matveev, Leonid Petrov.  *$q$ -randomized Robinson-Schensted-Knuth correspondences and random polymers*, **Annales de l'Institut Henri Poincaré D: Combinatorics, Physics and their Interactions** **4** (2017), no. 1, 1-123. [arXiv:1504.00666 \[math.PR\]](#). (PDF link). 123 pages.
- [18] Ivan Corwin, Leonid Petrov. *Stochastic higher spin vertex models on the line*, **Communications in Mathematical Physics** **343** (2016), no. 2, 651-700. [arXiv:1502.07374 \[math.PR\]](#). (PDF link). 50 pages.
- [17] Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. *Spectral theory for interacting particle systems solvable by coordinate Bethe ansatz*, **Communications in Mathematical Physics** **339** (2015), no. 3, 1167-1245. [arXiv:1407.8534 \[math-ph\]](#). (PDF link). 79 pages.
- [16] Alexey Bufetov, Leonid Petrov. *Law of Large Numbers for Infinite Random Matrices over a Finite Field*, **Selecta Mathematica** **21** (2015), no. 4, 1271-1338. [arXiv:1402.1772 \[math.PR\]](#). (PDF link). 68 pages.
- [15] Alexei Borodin, Leonid Petrov. *Integrable probability: From representation theory to Macdonald processes*, **Probability Surveys**, **11** (2014), 1-58. [arXiv:1310.8007 \[math-ph\]](#). (PDF link). 58 pages.

- [14] Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. *Spectral theory for the  $q$ -Boson particle system*, **Compositio Mathematica**, **151** (2015), no. 1, 1-67. [arXiv:1308.3475 \[math-ph\]](#). [\(PDF link\)](#). 67 pages.
- [13] Ivan Corwin, Leonid Petrov. *The  $q$ -PushASEP: A New Integrable Model for Traffic in 1+1 Dimension*, **Journal of Statistical Physics**, **160** (2015), no. 4, 1005-1026. [arXiv:1308.3124 \[math.PR\]](#). [\(PDF link\)](#). 22 pages.
- [12] Alexei Borodin, Leonid Petrov. *Nearest neighbor Markov dynamics on Macdonald processes*, **Advances in Mathematics**, **300** (2016), 71-155. [arXiv:1305.5501 \[math.PR\]](#). [\(PDF link\)](#). 85 pages.
- [11] Leonid Petrov. *The Boundary of the Gelfand-Tsetlin Graph: New Proof of Borodin-Olshanski's Formula, and its  $q$ -analogue*, **Moscow Mathematical Journal**, **14** (2014) no. 1, 121-160. [arXiv:1208.3443 \[math.CO\]](#). [\(PDF link\)](#). 36 pages.
- [10] Leonid Petrov. *Asymptotics of uniformly random lozenge tilings of polygons. Gaussian free field*, **Annals of Probability**, **43** (2014), no. 1, 1-43. [arXiv:1206.5123 \[math.PR\]](#). [\(PDF link\)](#). 43 pages.
- [9] Leonid Petrov. *Asymptotics of Random Lozenge Tilings via Gelfand-Tsetlin Schemes*, **Probability Theory and Related Fields**, **160** (2014), no. 3, 429-487. [arXiv:1202.3901 \[math.PR\]](#). [\(PDF link\)](#). 59 pages.
- [8] Leonid Petrov.  *$sl(2)$  Operators and Markov Processes on Branching Graphs*, **Journal of Algebraic Combinatorics** **38** (2013), no. 3, 663-720. [arXiv:1111.3399 \[math.CO\]](#). [\(PDF link\)](#). 58 pages.
- [7] Leonid Petrov. *On Measures on Partitions Arising in Harmonic Analysis for Linear and Projective Characters of the Infinite Symmetric Group*, **Proceedings of the international conference "50 years of IITP"**. [arXiv:1107.0676 \[math.CO\]](#). [\(PDF link\)](#). 7 pages.
- [6] Leonid Petrov. *Pfaffian Stochastic Dynamics of Strict Partitions*, **Electronic Journal of Probability** **16** (2011), 2246-2295. [arXiv:1011.3329 \[math.PR\]](#). [\(PDF link\)](#). 50 pages.
- [5] Leonid Petrov. *Random Strict Partitions and Determinantal Point Processes*, **Electronic Communications in Probability** **15** (2010), 162-175. [arXiv:1002.2714 \[math.PR\]](#). [\(PDF link\)](#). 14 pages.
- [4] Leonid Petrov. *Random Walks on Strict Partitions*, **Journal of Mathematical Sciences** **168** (2010), no. 3, 437-463. [arXiv:0904.1823 \[math.PR\]](#). [\(PDF link\)](#). 27 pages.
- [3] Leonid Petrov. *Limit Behavior of Certain Random Walks on Strict Partitions*, **Russian Mathematical Surveys** **64** (2009), no. 6, 1139-1141. [\(PDF link\)](#). 3 pages.
- [2] Leonid Petrov. *A Two-parameter Family of Infinite-dimensional Diffusions in the Kingman Simplex*, **Functional Analysis and Its Applications** **43** (2009), no. 4, 279-296. [arXiv:0708.1930 \[math.PR\]](#). [\(PDF link\)](#). 18 pages.

- [1] Leonid Petrov. *Asymptotic Behavior of a Certain Collection of Particles on a Line Under Synchronization*, Proceedings of the XXVIII Conference of Young Scientists of Department of Mechanics and Mathematics of the Lomonosov Moscow State University (2006), 152–156, in Russian. ([PDF link](#)). 4 pages.

## Errata

- [18] Ivan Corwin, Leonid Petrov. Correction to "Stochastic higher spin vertex models on the line", **Commun. Math. Phys.** **371**, 353–355 (2019). ([PDF link](#)). 3 pages.
- [17] Alexei Borodin, Ivan Corwin, Leonid Petrov, Tomohiro Sasamoto. Correction to "Spectral theory for interacting particle systems solvable by coordinate Bethe ansatz", **Commun. Math. Phys.** **370**, 1069–1072 (2019). ([PDF link](#)). 4 pages.

## Unpublished lecture notes

- [7] Random matrices, graduate topics course at University of Virginia, Spring 2025. [Course webpage with lecture notes](#). ([PDF link](#)), 3.4MB, 232 pages.
- [6] Asymptotic Representation Theory, graduate topics course at University of Virginia, Fall 2022. [Course webpage with lecture notes](#). ([PDF link](#)), 102 MB.
- [5] Particle systems, graduate topics course at University of Virginia, Spring 2021. [Lecture notes in Obsidian format on github](#). ([PDF link](#)), 312 MB.
- [4] Random matrices, graduate topics course at University of Virginia, Fall 2019. [Course webpage with lecture notes](#). ([PDF link](#)), 38 MB.
- [3] Random matrices, graduate topics course at University of Virginia, Spring 2016. [Lecture notes on github](#). ([PDF link](#)), 700 KB.
- [2] Topics in Probability, graduate topics course at Northeastern University, Fall 2012. [Lecture notes at AMS Open Notes](#). ([PDF link](#)), 1.7 MB.
- [1] Course notes "Asymptotic representation theory", taught by G. Olshanski at the Independent University of Moscow, Fall 2009 and Spring 2010 (in Russian) . [Webpage with notes](#). ([PDF link](#)), 2.6 MB.

## Other works

- [1] Sihan Li, Andrew Mecca, Jeewoo Kim, Giusy Caprara, Elizabeth Wagner, Ting-Ting Du, Leonid Petrov, Wenhao Xu, Runjia Cui, Ivan Rebustini, Bechara Kachar, Anthony Peng, and Jung-Bum Shin, *Myosin-VIIa is expressed in multiple isoforms and essential for tensioning the hair cell mechanotransduction complex*. **Nature Communications**, **11**, Article number: 2066 (2020). ([PDF link](#)). 15 pages.