Peter Koroteev

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Employment History

2019-current *Lecturer*, University of California, Berkeley, Department of Mathematics
2016-2019 *Krener Assistant Professor*, University of California, Davis, Department of Mathematics
2012-2016 *Postdoctoral Fellow*, Perimeter Institute for Theoretical Physics, Waterloo, ON, Canada.

Research Interests

Representation Theory, Algebraic Geometry, Integrable Systems, String Theory, Mathematical Physics

Appointments held

2017 *Visitor*, IHES, Bures-sue-Yvette, France
2014, 2017 *Visitor*, Kavli Institute for Theoretical Physics, Santa Barbara
2012 *Graduate Fellow*, Kavli Institute for Theoretical Physics, Santa Barbara
2008-2012 *Graduate Student*, University of Minnesota, Minneapolis
2007-2009 *Visiting Researcher*, Albert Einstein Institute, Max Planck Institute, Golm, Germany

Education

2012 PhD: University of Minnesota
2008 MSc: Moscow Institute of Physics and Technology
2006 BSc: Moscow Institute of Physics and Technology

Grants, honors & awards

2012 KITP Graduate Fellowship (NSF)
2011 Anatoly Larkin Fellowship in Physics at University of Minnesota
2009-2010 GAPSA travel grants by University of Minnesota
2007-2008 N.N. Bogolyubov stipend for senior students by INR RAS, Moscow
2007-2008 Dynasty Foundation prize for senior undergraduate students
2006-2007 Research student fellowship by ITEP, Moscow

Teaching

University of California, Berkeley
Math-142 *Elementary Algebraic Topology*. Spring semester 2019
Math-H185 *Honors Introduction to Complex Analysis*. Spring semester 2019
Math-185 *Introduction to Complex Analysis*. Fall semester 2019

University of California, Davis
MAT-125A *Real Analysis*. Spring quarter 2016
MAT-108 *Introduction to Abstract Math*. Winter quarter 2016
MAT-016A *Short Calculus*. Spring quarter 2017
MAT-25 *Advanced Calculus*. Winter quarter 2018
MAT-16B *Calculus*. Spring quarter 2018
MAT-21B *Calculus*. Fall quarter 2018

Lecture courses

2014 Duluth Winter School 2014 on Supersymmetry and String Theory [link]. Week long lecture course on Supersymmetry and String Theory [notes].

Invited talks

2020 Mathematical Physics Seminar, University of North Carolina, Chapel Hill, NC
Joint AMS Meeting, Denver, CO
Algebra and Geometry seminar, California Institute of Technology, Pasadena, CA
2019 Workshop "Geometric Representation Theory and Quantum Field Theories", Tsinghua Sanya International Mathematics Forum, Sanya, China
Geometry, Physics, and Representation Theory Seminar, Northeastern University, Boston, MA
Workshop "BPS/CFT Correspondence", Centre International de Rencontres Mathematiques, Marseille, France [link]
Conference "Verlinde Algebra and Grassmannian", Sun Yatsen University, Guangzhou, China. [link][slides]
Conference 'Non-Local Aspects of Holomorphic and Topological Field Theory', IHES, France. [link]
Workshop 'Representation theory, gauge theory and integrable systems', Kavli IPMU, University of Tokyo, Japan. [link]
2018 Conference on Quantum K-theory and related topics. Korean Institute for Advanced Study, Seoul, Korea [link]
Workshop 'Exactly Solvable Models of Quantum Field Theory and Statistical Mechanics'. Simons Center for Geometry and Physics, Stony Brook, NY
High Energy Physics seminar. Arizona State University, Department of Physics, Phoenix, AZ
Algebraic Geometry seminar. Arizona State University, Department of Mathematics, Phoenix, AZ

Mirror Symmetry group seminar. Kansas State University, Manhattan, KS
Workshop "SCFTs in 6 and lower dimensions". The Yau Mathematical Sciences Center at Tsinghua University [slides]

2017 The Yau Mathematical Sciences Center at Tsinghua University, Beijing, China
Informal Mathematical Physics Seminar. Columbia University, Department of Mathematics [link]
High Energy Physics seminar. Arizona State University, Department of Physics, Phoenix, AZ
XXVth International Conference on Integrable Systems and Quantum symmetries. Prague, Czech Republic
Theory group lunch seminar. University of Amsterdam, Amsterdam, Netherlands
High energy theory seminar. Uppsala University, Uppsala, Sweden

2016 School and Workshop on Geometric Correspondences of Gauge Theories, ICTP, Trieste, Italy [slides][video]
Colloquium at University of Virginia, Department of Mathematics, Charlottesville, VA
Geometry and Physics Seminar, University of Texas, Austin, TX
High Energy Physics Seminar, University of Toronto, Toronto, ON, Canada
Korean Institute for Advanced Study, String seminar, Seoul, Korea
9th Taiwan String Workshop, Taipei, Taiwan
International Seminar 'Quarks-2016', Pushkin, Russia
String Theory Seminar, University of California at Davis, CA
Continuous Advances in QCD 2016, Minneapolis, MN [slides]

2015 Korean Institute for Advanced Study, String seminar, Seoul, Korea
Kavli Institute of Physics and Mathematics of the Universe, String seminar, Kashiwa, Japan
California Institute of Technology, High energy physics seminar, Pasadena, CA
CERN, High energy physics seminar, Geneva, Switzerland
Workshop on Classical and Quantum Integrable Systems, Protvino, Russia
String/high energy seminar at Imperial College, UK
Workshop on Geometric Correspondences of Gauge Theories 5, SISSA, Trieste, Italy [site]
High energy physics group seminar, University of Toronto, Toronto, ON

2014 Fine Theoretical Physics Institute Seminar, University of Minnesota
High Energy seminar, CERN, Switzerland
Workshop on Geometric Correspondences of Gauge Theories 4, SISSA, Trieste, Italy
Seminar at Simons Center for Geometry and Physics, Stony Brook, NY [video]
String seminar, University of California, Berkeley
Talk at New Methods in Nonperturbative Quantum Field Theory, Kavli Institute for Theoretical Physics, Santa Barbara [video]
High energy physics group seminar, University of South California
Theory group seminar, University of Texas, Austin
High energy physics group seminar, California Institute of Technology
String Theory seminar, University of California, Berkeley
High energy physics group seminar, University of Minnesota, Duluth

2013 Quiver Varieties Program seminar, SCGP, Stony Brook University [video]

String theory seminar at Oxford University, UK
String theory seminar at DAMTP, Cambridge University, UK
High energy seminar at Queen Mary College, UK
String/high energy seminar at Imperial College, UK
Great Lakes Strings conference, University of Kentucky [video]
Continuous Advances in QCD, University of Minnesota [slides]
2012 Workshop on Integrability in Modern Theoretical and Mathematical Physics, SCGP, Stony Brook University [video]
High energy physics group seminar, University of Toronto
High energy physics group seminar, California Institute of Technology
Workshop on N=2 Jeometry And ApplicationZ, McGill University, Montreal [slides]
Theory group seminar. McGill University, Montreal [abstract]
2011 Continuous Advances in QCD, University of Minnesota [slides]
Theory group seminar. University of Victoria
2010 High Energy group seminar. University of British Columbia, Vancouver
2008 Elementary particle physics group seminar, Niels Bohr Institute, Copenhagen
String theory group seminar, Utrecht University
String seminar, Imperial College, London

Selected Publications

In Preparation

"Branes and DAHA Representations"
S. Gukov, P. Koroteev, S. Nawata, D. Pei, and I. Saberi. To appear in 2020.

Preprints

1. **"q-Opers, QQ-Systems, and Bethe Ansatz,"**
   E. Frenkel, P. Koroteev, D. S. Sage and A. M. Zeitlin,
   arXiv:2002.07344 [math.AG].

2. **"$(SL(N), q)$-opers, the q-Langlands correspondence, and quantum/classical duality"**
   P. Koroteev, D. S. Sage and A. M. Zeitlin.
   arXiv:1811.09937 [math.RT]
   Submitted to **Communications in Mathematical Physics**.

3. **"A-type Quiver Varieties and ADHM Moduli Spaces"**
   P. Koroteev.
   arXiv:1805.00986 [math.AG]
   Submitted to **Communications in Mathematical Physics**.

4. **"Quantum K-theory of Quiver Varieties and Many-Body Systems"**
   P. Koroteev, P. P. Pushkar, A. Smirnov and A. M. Zeitlin.

arXiv:1705.10419 [math.AG]
Submitted to **Selecta Mathematica New Series**.

Journal articles

1. **"The Quantum DELL System,"**
P. Koroteev and S. Shakirov,
arXiv:1906.10354 [hep-th].
Accepted in **Lett. Math. Phys.**

2. **"qKZ/tRS Duality via Quantum K-Theoretic Counts"**
P. Koroteev and A. M. Zeitlin.
arXiv:1802.04463 [math.AG]
Accepted in **Mathematical Research Letters**.

3. **"On Elliptic Algebras and Large-n Supersymmetric Gauge Theories"**
P. Koroteev and A. Sciarappa.
arXiv:1601.08238 [hep-th]
DOI:10.1063/1.4966641
J. Math. Phys. **57**, no. 11, 112302 (2016)

4. **"Quantum Hydrodynamics from Large-n Supersymmetric Gauge Theories"**
P. Koroteev and A. Sciarappa.
arXiv:1510.00972 [hep-th]
DOI:10.1007/s11005-017-0996-1
Lett. Math. Phys. **108**, no. 1, 45 (2018)

5. **"Defects and Quantum Seiberg-Witten Geometry"**
M. Bullimore, H. C. Kim and P. Koroteev.
arXiv:1412.6081 [hep-th]
DOI:10.1007/JHEP05(2015)095
JHEP **1505**, 095 (2015)

6. **"Resurgence and Holomorphy: From Weak to Strong Coupling"**
A. Cherman, P. Koroteev and M. Ünsal.
arXiv:1410.0388 [hep-th]
DOI:10.1063/1.4921155
J. Math. Phys. **56**, no. 5, 053505 (2015)

7. **"On Three Dimensional Quiver Gauge Theories and Integrability"**
D. Gaiotto and P. Koroteev.
arXiv:1304.0779 [hep-th]
DOI:10.1007/JHEP05(2013)126
JHEP **1305**, 126 (2013)

8. **"Statistical mechanics of Coulomb gases as quantum theory on Riemann surfaces"**

T. Gulden, M. Janas, P. Koroteev and A. Kamenev.
arXiv:1303.6386 [cond-mat.stat-mech]
DOI:10.1134/S1063776113110095
J. Exp. Theor. Phys. **117**, 517 (2013)

9. **"BPS States in Omega Background and Integrability"**
K. Bulycheva, H. Y. Chen, A. Gorsky and P. Koroteev.
arXiv:1207.0460 [hep-th]
DOI:10.1007/JHEP10(2012)116
JHEP **1210**, 116 (2012)

10. **"Quantum Deformations of the One-Dimensional Hubbard Model"**
N. Beisert and P. Koroteev.
arXiv:0802.0777 [hep-th]
DOI:10.1088/1751-8113/41/25/255204
J. Phys. A **41**, 255204 (2008)

11. **"On Existence of Self-Tuning Solutions in Static Braneworlds without Singularities"**
P. Koroteev and M. Libanov.
arXiv:0712.1136 [hep-th]
DOI:10.1088/1126-6708/2008/02/104
JHEP **0802**, 104 (2008)

12. **"Morse theory in field theory"**
P. Koroteev and A. V. Zayakin.
hep-th/0508153
DOI:10.7546/giq-8-2007-207-220
207–220, Softex, Sofia, Bulgaria, 2007

References

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