

Curriculum Vitae

Masahiro Nozaki

Personal data

First name: Masahiro
Last name: Nozaki
Date of birth: October 10, 1986
Place of birth: Tokyo, Japan
Nationality: Japanese
Position: Special Postdoctoral Researcher at iTHEMS, Riken.
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Education

period	position	place
4/2006 – 3/2010	Undergraduate student	Department of Science and Technology, Keio University
4/2010 – 3/2015	Ph.D. student	Yukawa Institute for Theoretical Physics, Kyoto University
4/2014 – 3/2015	DC2	Yukawa Institute for Theoretical Physics, Kyoto University
4/2015 – 9/2015	JSPS Postdoctoral fellow	Yukawa Institute for Theoretical Physics, Kyoto University
9/2015 – 9/2018	Kadanoff Center Fellow	The Kadanoff Center for Theoretical Physics, The University of Chicago
10/2018 - Present	Special Postdoctoral Researcher	Riken
2020-	Tenure-Track AP	Kavli Institute for Theoretical Sciences (KITS), University of Chinese Academy of Sciences (UCAS), Beijing

Academic degrees

month/year	degree	subject	University
March, 2010	Bachelor of Science	physics	Keio University
March, 2012	Master of Science	physics	Kyoto University
March, 2015	Doctor of Science	physics	Kyoto University (Ph.D. Advisor: Tadashi Takayanagi)

Research experience

Apr. 2012 – Mar. 2013, Research Assistant, Yukawa Institute for Theoretical Physics,

Research award

Mar. 2016, 10-th Young Scientist Award of the Physical Society of Japan

Grants

1. JSPS had given me 1000000 and 200000 Yen as annual research fund and fellow support, respectively, from Apr. 2014 to Mar. 2015.
2. JSPS had given me 1170000 and 362000 Yen as annual research fund and fellow support, respectively, from Apr. 2015 to Sep. 2015.
3. I had Grant-in-Aid for Early-Career Scientists as Multi-year Fund:
Fiscal Year 2021 : 780,000 Yen (Direct Cost : 600,000 Yen, Indirect Cost : 180,000 Yen)
Fiscal Year 2020 : 1,690,000 Yen (Direct Cost : 1,300,000 Yen, Indirect Cost : 390,000 Yen)
Fiscal Year 2019 : 1,690,000 Yen (Direct Cost : 1,300,000 Yen, Indirect Cost : 390,000 Yen)

Talks at international conference

Invited

- June. 2019 “Signature of quantum chaos in operator entanglement in 2d CFTs” Holography, Quantum Information and String Theory, YITP Kyoto university, Japan
- Mar. 2018 “Entanglement Spreading and Oscillation” Holography, Quantum Entanglement and Higher Spin Gravity II, YITP Kyoto university, Japan
- Sep. 2015 “Quantum Entanglement of Local Operators in various CFTs” International Workshop on Strings, Black Holes and Quantum Information, Tohoku university, Japan.

Jan. 2013 “Holographic Geometry of Entanglement Renormalization in QFT,” Quantum Aspects of Black Holes, Sogang University, Korea.

Oral talks

- Jul. 2018 “Operator entanglement and scrambling” New Frontiers in String Theory 2018, YITP Kyoto university, Japan
- Aug. 2017 “Dynamics of Entanglement in Smooth Quenches” Quantum Information in Quantum Gravity III, Canada.
- Jun. 2016 “Quantum Entanglement of Operators in Various Field Theories,” Quantum Matter, Spacetime and Information, YITP Kyoto university, Japan
- Jan. 2016 “Quantum Entanglement of Operators,” The 10th Asian Winter School on Strings, Particles and Cosmology, Japan
- May. 2015 “Quantum Entanglement of Local Operators,” Strings 2015, ICTS-TIFR, India
- May. 2015 “Quantum Entanglement of Local Operators,” International Workshop on Condensed Matter Physics and AdS/CFT, Kavli IPMU, Japan.
- Jan. 2015 “Quantum Entanglement of Local Operators,” KEK Theory Workshop 2015, KEK, Japan
- Aug. 2014 “Quantum Entanglement of Local Operators,” Quantum Information in Quantum Gravity, The University of British Columbia, Canada
- Jul. 2014 “Notes on Quantum Entanglement of Local Operators,” Strings and Fields, YITP Kyoto university, Japan
- May 2014 “Quantum Entanglement of Local Operators,” Holographic vistas on Gravity and Strings, YITP Kyoto university, Japan

Poster talks

- Jun. 2018 “Entanglement Spreading and Oscillation,” Strings and Fields 2018, YITP Kyoto university, Japan
- Jun. 2018 “Entanglement Spreading and Oscillation,” Strings 2018, OIST, Japan
- Aug. 2014 “Quantum Entanglement of Local Operators,” YITP Workshop on Quantum Information Physics (YQIP2014), YITP Kyoto university, Japan
- Jun. 2014 “Quantum Entanglement of Local Operators,” Strings 2014, Princeton university, USA

- Feb. 2014 “Quantum Entanglement of Local Operators in Conformal Field Theories,” KEK Theory Workshop 2014, KEK, Japan
- Jul. 2013 “Holographic Local Quenches and Entanglement Density,” KIAS-YITP joint workshop 2013, Sogang University, Korea

Talks at domestic conference

Invited

- Jul. 2016 “Entanglement Entropy for Locally Excited States” JPS 71th annual meeting, Tohoku gakuin University, Japan

Oral talks

- Mar. 2015 “Entanglement of Local Operators in large N CFTs,” JPS 70th annual meeting, Waseda University, Japan
- Sep. 2014 “Quantum Entanglement of Operators,” JPS Autumn meeting, Saga University, Japan
- Mar. 2014 “Fundamental Property of Renyi Entropy for Locally Excited State,” JPS 69th annual meeting, Tokai University, Japan
- Sep. 2013 “Holographic Local Quenches and Entanglement Density,” JPS Autumn meeting, Kochi University, Japan
- Aug. 2013 “Thermodynamical Property of Entanglement Entropy for Excited States,” Thermal Quantum Field Theory and Their Applications, YITP Kyoto University, Japan
- Jul. 2013 “Thermodynamical Property of Entanglement Entropy for Excited States,” YITP Workshop Field Theory and String Theory, YITP Kyoto University, Japan
- Mar. 2013 “Holographic Geometry of Entanglement Renormalization in Quantum Field Theories,” JPS 68th annual meeting, Hiroshima university, Japan
- Sep. 2012 “Central Charges for BCFTs and Holography,” JPS Autumn meeting, Kyoto sangyo university, Japan
- Jul. 2012 “Central Charges for BCFTs and Holography,” YITP Workshop Field Theory and String Theory, YITP Kyoto University, Japan

Poster talks

- Mar. 2014 “Quantum Entanglement of Local Operators in Conformal Field Theories,” QMKEK , YITP Kyoto University, Japan

Proceedings

- “Thermodynamical Property of Entanglement Entropy for Excited States” J. Bhattacharya, M. Nozaki, T. Takayanagi and T. Ugajin, Thermal Quantum Field Theory and Their Applications

Seminar and colloquia

Oversee

- Mar. 2013 Perimeter Institute, Canada.
- Jan. 2013 Kyoto University, Japan.
- Apr. 2013 Tokyo University, Komaba, Japan.
- Jun. 2014 KIAS, Korea.
- Jun. 2014 Hanyang University, Korea.
- Jul. 2014 Riken, Japan.
- Oct. 2014 Rikkyo University, Japan.
- Oct. 2014 Tokyo University, Hongo, Japan.
- Oct. 2014 Kavli IPMU, Japan.
- Nov. 2014 National Taiwan University, Taiwan.
- Nov. 2014 Osaka University, Osaka.
- May. 2015 Nordita, Sweden.
- May. 2015 Vienna University of Technology, Austria.
- Jun. 2015 Nagoya University, Nagoya.
- Mar. 2016 University of Illinois Urbana-Champaign, USA.
- Nov. 2016 University of Kentucky, USA.
- Aug. 2017 University of Illinois Urbana-Champaign, USA.
- Dec. 2017 Perimeter Institute, Canada.

Domestic

Mar. 2013 Kyoto university.

Apr. 2013 Tokyo university.

Jul. 2014 Riken.

Oct. 2014 Rikkyo university.

Oct. 2014 Tokyo university.

Oct. 2014 Tokyo university.

Oct. 2014 Kavli IPUM.

Nov. 2014 Osaka university.

Jun. 2015 Nagoya university.

Jan. 2017 Kavli IPMU.

Feb. 2019 Tokyo university.

Feb. 2019 Nagoya university.

Feb. 2019 KEK.

Research supports

2014– Sept. 2015 JSPS Fellowship, YITP, Kyoto university.

Background

Language: Japanese and English.

Publication list

1. **“Quantum vs. classical information: operator negativity as a probe of scrambling”**
J. Kudler-Flam, M. Nozaki, S. Ryu and M. T. Tan.
arXiv:1906.07639 [hep-th]
2. **“Entanglement after Quantum Quenches in Lifshitz Scalar Theories”**
K. Y. Kim, M. Nishida, M. Nozaki, M. Seo, Y. Sugimoto and A. Tomiya.
arXiv:1906.05476 [hep-th]
USTC-ICTS-19-14
3. **“Holographic Duals of Inhomogeneous Systems: The Rainbow Chain and the Sine-Square Deformation Model”**
I. MacCormack, A. Liu, M. Nozaki and S. Ryu.
arXiv:1812.10023 [cond-mat.str-el]
4. **“Dynamics of logarithmic negativity and mutual information in smooth quenches”**
H. Fujita, M. Nishida, M. Nozaki and Y. Sugimoto.
arXiv:1812.06258 [hep-th]
OCU-PHYS 492, USTC-ICTS-18-22
5. **“Signature of quantum chaos in operator entanglement in 2d CFTs”**
L. Nie, M. Nozaki, S. Ryu and M. T. Tan.
arXiv:1812.00013 [hep-th]
6. **“Entanglement Spreading and Oscillation”**
M. Nishida, M. Nozaki, Y. Sugimoto and A. Tomiya.
arXiv:1712.09899 [hep-th]
DOI:10.1088/1742-5468/ab14d9
J. Stat. Mech. **1905**, 053102 (2019)
EFI-17-29, OU-HET-955
7. **“Correspondence between entanglement growth and probability distribution of quasiparticles”**
M. Nozaki and N. Watamura.
arXiv:1703.06589 [hep-th]
DOI:10.1103/PhysRevD.96.025019
Phys. Rev. D **96**, no. 2, 025019 (2017)
EFI-17-7
8. **“Quantum Quench and Scaling of Entanglement Entropy”**
P. Caputa, S. R. Das, M. Nozaki and A. Tomiya.
arXiv:1702.04359 [hep-th]
DOI:10.1016/j.physletb.2017.06.017
Phys. Lett. B **772**, 53 (2017)
EFI-17-4, YITP-17-16, UK-17-02
9. **“Quantum Entanglement of Locally Excited States in Maxwell Theory”**
M. Nozaki and N. Watamura.
arXiv:1606.07076 [hep-th]
DOI:10.1007/JHEP12(2016)069
JHEP **1612**, 069 (2016)

10. **“Charged Entanglement Entropy of Local Operators”**
P. Caputa, M. Nozaki and T. Numasawa.
arXiv:1512.08132 [hep-th]
DOI:10.1103/PhysRevD.93.105032
Phys. Rev. D **93**, no. 10, 105032 (2016)
NORDITA-2015-137, EFI-15-38, YITP-15-118
11. **“Quantum Entanglement of Fermionic Local Operators”**
M. Nozaki, T. Numasawa and S. Matsuura.
arXiv:1507.04352 [hep-th]
DOI:10.1007/JHEP02(2016)150
JHEP **1602**, 150 (2016)
YITP-15-54
12. **“On the definition of entanglement entropy in lattice gauge theories”**
S. Aoki, T. Iritani, M. Nozaki, T. Numasawa, N. Shiba and H. Tasaki.
arXiv:1502.04267 [hep-th]
DOI:10.1007/JHEP06(2015)187
JHEP **1506**, 187 (2015)
YITP-2015-8
13. **“Entanglement of local operators in large-N conformal field theories”**
P. Caputa, M. Nozaki and T. Takayanagi.
arXiv:1405.5946 [hep-th]
DOI:10.1093/ptep/ptu122
PTEP **2014**, 093B06 (2014)
YITP-14-42, IPMU-14-0123
14. **“Notes on Quantum Entanglement of Local Operators”**
M. Nozaki.
arXiv:1405.5875 [hep-th]
DOI:10.1007/JHEP10(2014)147
JHEP **1410**, 147 (2014)
YITP-14-41
15. **“Quantum Entanglement of Local Operators in Conformal Field Theories”**
M. Nozaki T. Numasawa and T. Takayanagi.
arXiv:1401.0539 [hep-th]
DOI:10.1103/PhysRevLett.112.111602
Phys. Rev. Lett. **112**, 111602 (2014)
IPMU13-0244, YITP-13-132
16. **“Holographic Geometry of cMERA for Quantum Quenches and Finite Temperature”**
A. Mollabashi, M. Nozaki, S. Ryu and T. Takayanagi.
arXiv:1311.6095 [hep-th]
DOI:10.1007/JHEP03(2014)098
JHEP **1403**, 098 (2014)
YITP-13-117, IPMU13-0224, IPM-P-2013-045
17. **“Dynamics of Entanglement Entropy from Einstein Equation”**
M. Nozaki, T. Numasawa, A. Prudenziati and T. Takayanagi.
arXiv:1304.7100 [hep-th]
DOI:10.1103/PhysRevD.88.026012
Phys. Rev. D **88**, no. 2, 026012 (2013)
YITP-13-29, IPMU-13-0083
18. **“Holographic Local Quenches and Entanglement Density”**
M. Nozaki, T. Numasawa and T. Takayanagi.
arXiv:1302.5703 [hep-th]
DOI:10.1007/JHEP05(2013)080

JHEP **1305**, 080 (2013)
YITP-13-14, IPMU-13-0045

19. “**Thermodynamical Property of Entanglement Entropy for Excited States**”

J. Bhattacharya, M. Nozaki, T. Takayanagi and T. Ugajin.

arXiv:1212.1164 [hep-th]

DOI:10.1103/PhysRevLett.110.091602

Phys. Rev. Lett. **110**, no. 9, 091602 (2013)

IPMU12-0220, YITP-12-99

20. “**Holographic Geometry of Entanglement Renormalization in Quantum Field Theories**”

M. Nozaki, S. Ryu and T. Takayanagi.

arXiv:1208.3469 [hep-th]

DOI:10.1007/JHEP10(2012)193

JHEP **1210**, 193 (2012)

YITP-12-72, IPMU12-0159

21. “**Central Charges for BCFTs and Holography**”

M. Nozaki, T. Takayanagi and T. Ugajin.

arXiv:1205.1573 [hep-th]

DOI:10.1007/JHEP06(2012)066

JHEP **1206**, 066 (2012)

YITP-12-42, IPMU12-0087