

Yasuki Tachibana

✉ yasuki.tachibana@gmail.com

Research Interests

The dynamics of the QGP created in relativistic heavy-ion collisions.
In particular, the interplay between the QGP fluid and jets.

Experience

Apr. 2020–

Oct. 2017–Mar. 2020 POST-DOCTORAL RESEARCHER

Department of Physics and Astronomy, College of Liberal Arts and Sciences,
Wayne State University

Mar. 2016–Sep. 2017 POST-DOCTORAL RESEARCHER

Institute of Particle Physics and Key Laboratory of Quark and Lepton Physics (MOE),
Central China Normal University

Sep. 2015–Feb. 2016 SHORT-TERM LECTURER

Nishinippon Institute of Technology

Apr. 2015–Sep. 2015 POST-DOCTORAL RESEARCHER

Theoretical Research Division, Nishina Center for Accelerator-Based Science, RIKEN

Apr. 2013–Mar. 2015 RESEARCH FELLOW

Japan Society for the Promotion of Science (JSPS) for Young Scientists (DC2)

Mar. 2012–Mar. 2015 COURSE STUDENT (*Secondary Supervisor: Prof. Takao Someya*)

Advanced Leading Graduate Course for Photon Science (ALPS), The University of Tokyo

Apr. 2012–Present CO-RESEARCHER PARTNERSHIP (*Host Professor: Prof. Tetsufumi Hirano*)

Faculty of Science and Technology, Sophia University

Apr. 2012–Mar. 2015 STUDENT TRAINEE (*Host Scientist: Prof. Tetsuo Hatsuda*)

Theoretical Research Division, Nishina Center for Accelerator-Based Science, RIKEN

Education

Apr. 2012–Mar. 2015 DOCTOR OF PHILOSOPHY (*Ph.D.*)

Department of Physics, Graduate School of Science, The University of Tokyo

Supervisor: *Prof. Tetsuo Hatsuda*

Thesis title: “*Hydrodynamic response to jet propagation in quark-gluon plasma*”

Apr. 2010–Mar. 2012 MASTER OF SCIENCE (*M.Sc.*)

Department of Physics, Graduate School of Science, The University of Tokyo

Supervisor: *Prof. Tetsuo Hatsuda*

Thesis title: “*A Relativistic Hydrodynamic Model with Source Terms and
its Application to Heavy Ion Collisions*”

Apr. 2006–Mar. 2010 BACHELOR OF SCIENCE (*B.S.*)

Department of Physics, Faculty of Science, The University of Tokyo

Honors & Awards

Mar. 2019 YOUNG SCIENTIST AWARD OF THE PHYSICAL SOCIETY OF JAPAN (Theoretical Nuclear Physics)
Aug. 2012 INVITATION TO A POSTER FLASH TALK IN PLENARY SESSION (*Quark Matter 2012*, Washington D.C.)

Fellowships/Scholarships

Apr. 2013–Mar. 2015 Research Fellowships of Japan Society for the Promotion of Science (JSPS) for Young Scientists (DC2)
Mar. 2012–Mar. 2015 Advanced Leading Graduate Course for Photon Science (ALPS) course, The University of Tokyo
Apr. 2010–Mar. 2012 First Category Scholarship Loan Program by Japan Student Services Organization

Grants

FY2013 JPY 1100,000 Grant-in-Aid for Fellows of Japan Society for the Promotion of Science (JSPS)
FY2014 JPY 1100,000 Grant-in-Aid for Fellows of Japan Society for the Promotion of Science (JSPS)

Research Collaboration

Oct. 2017– JETSCAPE Collaboration [National Science Foundation (NSF) funded]

Community Services

REFeree FOR: Nuclear Physics A

ORGANIZER FOR:

Teaching Experiences

• LECTURES (IN ENGLISH)

–At Akita International University–

Apr. 2020–Aug. 2020 LECTURE FOR UNDERGRADUATE CLASS “*College Algebra*” (2 classes)

• LECTURES (IN JAPANESE)

–At Nishinippon Institute of Technology–

Sep. 2015–Mar. 2016 LECTURE FOR UNDERGRADUATE CLASS “*Fundamental Physics*” (2 classes)
• Taught compulsory course on basics of physics for first-year undergraduate students.
• Took charge of 2 classes (14 students on average in each class).
• Total number of school hours is 15* including midterm and term-end examinations.
*Equivalent to 22.5 hours (90 min/class).

Sep. 2015–Mar. 2016 LECTURE FOR UNDERGRADUATE CLASS “*Fundamental Physics (S)*”
• Taught advanced course on basics of physics for first-year undergraduate students.
• Took charge of 1 class with 24 students.
• Total number of school hours is 15* including midterm and term-end examinations.
*Equivalent to 22.5 hours (90 min/class).

–At Department of Physics, the University of Tokyo–

Apr. 2010–Mar. 2011 TEACHING ASSISTANT FOR UNDERGRADUATE CLASS “*Computational Experiments*”
• Responded to questions and marked test in course.
• Course was on basics of computer operation and numerical calculation for third-year undergraduate students.
• Managed computer room of Department of Physics.

Visits

May 2017	INSTITUTE FOR NUCLEAR THEORY	(INT Program INT-17-1b)
Feb. 2017	LAWRENCE BERKELEY NATIONAL LABORATORY	(Host: <i>Prof. Xin-Nian Wang</i>)
Mar. 2015	CENTRAL CHINA NORMAL UNIVERSITY	(Hosts: <i>Prof. Xin-Nian Wang and Prof. Guang-You Qin</i>)
Mar. 2014	INSTITUT DE PHYSIQUE THÉORIQUE DE SACLAY	(Host: <i>Prof. Jean-Yves Ollitrault</i>)
Mar. 2014	UNIVERSIDAD DE SANTIAGO DE COMPOSTELA	(Host: <i>Prof. Carlos A. Salgado</i>)


Computer Skills

Operating Systems	Macintosh, Linux, Microsoft Windows
Programming Languages	C/C++, Python, Perl
Softwares	Root

Languages Skill

Japanese	Native
English	Fluent

● PAPERS

- [1] [Y. Tachibana](#), C. Shen and A. Majumder,
“Bulk medium evolution has considerable effects on jet observables!,”
[arXiv:2001.08321 [nucl-th]].
- [2] Y. Kanakubo, [Y. Tachibana](#) and T. Hirano,
“Unified description of hadron yield ratios from dynamical core-corona initialization,”
Phys. Rev. C **101**, no.2, 024912 (2020) [arXiv:1910.10556 [nucl-th]].
- [3] A. Kumar, [Y. Tachibana](#), D. Pablos, C. Sirimanna, R. J. Fries et al. [JETSCAPE Collaboration],
“The JETSCAPE framework: p+p results,” [arXiv:1910.05481 [nucl-th]].
- [4] N.-B. Chang, [Y. Tachibana](#) and G.-Y. Qin,
“Nuclear modification of jet shape for inclusive jets and γ -jets at the LHC energies,”
Phys. Lett. B **801**, 10 (2020) [arXiv:1906.09562 [nucl-th]].
- [5] J. H. Putschke, K. Kauder, E. Khalaj et al. [JETSCAPE Collaboration],
“The JETSCAPE framework,” [arXiv:1903.07706 [nucl-th]].
- [6] Y. Kanakubo, M. Okai, [Y. Tachibana](#) and T. Hirano,
“Enhancement of strange baryons in high-multiplicity proton-proton and proton-nucleus collisions,”
PTEP **2018**, no. 12, 121D01 (2018) [arXiv:1806.10329 [nucl-th]].
- [7] M. Okai, K. Kawaguchi, [Y. Tachibana](#) and T. Hirano,
“A new approach to initialize hydrodynamic fields and mini-jet propagation in quark-gluon fluids,”
Phys. Rev. C **95**, 054914 (2017) [arXiv:1702.07541 [nucl-th]].
- [8] [Y. Tachibana](#), N.-B. Chang and G.-Y. Qin,
“Full jet in quark-gluon plasma with hydrodynamic medium response,”
Phys. Rev. C **95**, 044909 (2017) ( **Editors' Suggestion**) [arXiv:1701.07951 [nucl-th]].
- [9] [Y. Tachibana](#) and T. Hirano,
“Interplay between Mach cone and radial expansion and its signal in gamma-jet events,”
Phys. Rev. C **93**, 054907 (2016) [arXiv:1510.06966 [nucl-th]].
- [10] [Y. Tachibana](#) and T. Hirano,
“Momentum transport away from a jet in an expanding nuclear medium,”
Phys. Rev. C **90**, 021902(R) (2014) [arXiv:1402.6469 [nucl-th]].

● PROCEEDINGS*

- [1] Y. Tachibana et al. [JETSCAPE Collaboration],
“Hydrodynamic response to jets with a source based on causal diffusion,”
arXiv:2002.12250 [proceedings of Quark Matter 2019].
- [2] Y. Tachibana et al. [JETSCAPE Collaboration],
“Jet substructure modification in a QGP from a multi-scale description of jet evolution with JETSCAPE,”
PoS HardProbes **2018**, 099 (2018) [proceedings of Hard Probes 2018].
- [3] Y. Tachibana
“Medium response to jet-induced excitation: theory overview,”
Nucl. Phys. A **982**, 156 (2019) [proceedings of Quark Matter 2018, *refereed*].
- [4] Y. Tachibana
“Medium response to jets in heavy ion collisions,”
EPJ Web Conf. **172**, 05009 (2018) [proceedings of ISMD 2017].
- [5] Y. Tachibana, N.-B. Chang and G.-Y. Qin,
“Effect of hydrodynamic response in QGP on full jet,”
Nucl. Phys. A **967**, 568 (2017) [proceedings of Quark Matter 2017, *refereed*].
- [6] Y. Tachibana, N.-B. Chang and G.-Y. Qin,
“Flow excited by full jet shower in QGP fluid and its effect on jet shape,”
Nucl. Part. Phys. Proc. **289-290**, 141 (2017) [proceedings of Hard Probes 2016].
- [7] Y. Tachibana and T. Hirano,
“Interplay between Mach cone and radial expansion in jet events,”
Nucl. Phys. A **956**, 577 (2016) [proceedings of Quark Matter 2015, *refereed*].
- [8] Y. Tachibana and T. Hirano,
“Hydrodynamic excitation by jets in the expanding QGP,”
Nucl. Part. Phys. Proc. **276-278**, 173 (2016) [proceedings of Hard Probes 2015, *refereed*].
- [9] Y. Tachibana and T. Hirano,
“Di-jet asymmetric momentum transported by QGP fluid,”
Nucl. Phys. A **932**, 387 (2014) [proceedings of Hard Probes 2013, *refereed*].
- [10] Y. Tachibana and T. Hirano,
“Emission of Low Momentum Particles at Large Angles from Jet,”
Nucl. Phys. A **904-905**, 1023C (2013) [proceedings of Quark Matter 2012, *refereed*].

*Extract of contributions as a speaker.

Presentations

● INVITED TALKS

–International Conferences and Workshops–

- [1] “*Jet back reaction on the medium,*”
Hard Probes 2020, The University of Texas at Austin, June 1-5, 2020.
- [2] “*Interaction with jet and its medium response in quark-gluon plasma,*”
Thermal quantum field theory and its application,
Yukawa Institute for Theoretical Physics, Kyoto University, September 4th, 2019.
- [3] “*Status of JETSCAPE,*”
2019 RHIC & AGS Annual Users’ Meeting, Brookhaven National Laboratory, New York, June 4th, 2019
(for the JETSCAPE Collaboration).
- [4] “*Jets in QGP and medium response theory,*”
Fifth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, October 23rd 2018.
- [5] “*Jets with medium response,*”
The Definition of Jets in a Large Background, RIKEN BNL Research Center, New York, June 26th, 2018.
- [6] “*Medium response to jet-induced excitation: theory overview,*”
Quark Matter 2018, Venice, May 18th, 2018.
- [7] “*Medium response to jets in heavy ion collisions,*”
ISMD 2017, Tlaxcala City, Mexico, September 15th, 2017.
- [8] “*Jet medium interactions,*”
ATHIC 2016, New Delhi, India, February 19th, 2016.
- [9] “*Momentum Transport in Dijet+QGP-fluid,*”
Quadrangle 2014, High Energy Strong Interactions: A School for Young Asian Scientists,
Central China Normal University, September 23rd, 2014.
- [10] “*Emission of Low Momentum Particles at Large Angles from Jet,*”
Quark Matter 2012, Washington D.C., August 18th 2012.

–Domestic Conferences and Workshops (talks given in Japanese)–

- [1] “*Broadening of full jet in quark-gluon plasma with hydrodynamic medium response,*”
Spring meeting of Physics Society of Japan 2019, Kyushu University, March 15th, 2019.

● CONTRIBUTED TALKS

–International Conferences and Workshops–

- [1] *“Hydrodynamic response to jets with a source based on causal diffusion,”*
Quark Matter 2019, Wuhan, China, November 5th, 2019 (for the JETSCAPE Collaboration).
- [2] *“Jet substructure modification in multi-stage jet evolution with JETSCAPE,”*
2nd JETSCAPE Winter School and Workshop 2019, Texas A&M University, January 12th, 2019
(for the JETSCAPE Collaboration).
- [3] *“Jet substructure modifications in a QGP from multi-scale description of jet evolution with JETSCAPE,”*
Hard Probes 2018, Aix-Les-Bains, France, October 30th, 2018 (for the JETSCAPE Collaboration).
- [4] *“Jet modification with hydro medium response,”*
Precision Spectroscopy of QGP Properties with Jets and Heavy Quarks (INT Program INT-17-1b),
Institute for Nuclear Theory, University of Washington, May 10th, 2017.
- [5] *“Jet modification in QGP and hydrodynamic medium response,”*
Santa Fe Jets and Heavy Flavor Workshop, Santa Fe, February 14th, 2017
- [6] *“Effect of hydrodynamic response in QGP on full jet,”*
Quark Matter 2017, Chicago, February 8th, 2017.
- [7] *“Full jet including hydrodynamic response in heavy ion collisions,”*
The 32nd Heavy Ion Cafe, RIKEN, January 21st, 2017.
- [8] *“Flow excited by full jet shower in quark-gluon plasma fluid and its effect on jet shape,”*
Flow, Jet Quenching and Strong Coupling Physics, Huzhou University, China, December 17th, 2016.
- [9] *“Flow excited by full jet shower in QGP fluid and its effect on jet shape,”*
Hard Probes 2016, Wuhan, China, September 25th, 2016.
- [10] *“Interplay between Mach cone and radial expansion in jet events,”*
Quark Matter 2015, Kobe, Japan, September 28th, 2015.
- [11] *“Hydrodynamic excitation by jets in the expanding QGP,”*
Hard Probes 2015, McGill University, Montréal, June 30th, 2015.
- [12] *“Collective dynamics in dijet+QGP-fluid system,”*
Forth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, October 9th, 2014.
- [13] *“Momentum flow in dijet+QGP-fluid system,”*
ATHIC 2014, Osaka University, August 6th, 2014.
- [14] *“Collective flow induced by energetic partons in heavy-ion collisions,”*
The 26th Heavy Ion Cafe, The University of Tokyo, July 19th, 2014.
- [15] *“Di-jet asymmetric momentum transported by QGP fluid,”*
Hard Probes 2013, Stellenbosch Institute for Advanced Study, November 7th, 2013.
- [16] *“Collective Flow in the QGP Induced by Jets,”*
Phenomenology and Experiments at RHIC and LHC, KMI, Nagoya University, September 25th, 2012.
- [17] *“Emission of Low Momentum Particles at Large Angles from Jet,”*
Jet Modification in the RHIC and LHC Era (QM12 Satellite Workshop), Wayne State University, August 21st,
2012.

–Domestic Conferences and Workshops (talks given in Japanese)–

- [1] *“Hydrodynamic response to jet quenching in QGP,”*
HadNucl2015, KEK, 26 November 2015.
- [2] *“Transport of momenta from a jet in an expanding QGP fluid,”*
Autumn Meeting of Physical Society of Japan 2013, Kochi University, 21 September 2013.
- [3] *“Flows in the QGP Fluid Induced by Jets,”*
Autumn Meeting of Physical Society of Japan 2012, Kyoto Sangyo University, 12 September 2012.
- [4] *“Relativistic Hydrodynamic Model with a Source Term Induced by Jets,”*
Spring meeting of Physics Society of Japan 2012, Kwansei Gakuin University, 24 March 2012.

● POSTER PRESENTATIONS

–International Conferences and Workshops–

- [1] *“Interference effect between jet-induced flows in dijet events,”*
Quark Matter 2018, Venice, May 5th, 2018.
- [2] *“Medium response in asymmetric di-jet events from full 3-D hydro,”*
Quark Matter 2014, Darmstadt, May 20th, 2014.
- [3] *“Emission of Low Momentum Particles at Large Angles from Jet,”*
Quark Matter 2012, Washington D.C., August 16th, 2012.

● SEMINARS & OTHER TALKS

- [1] *“Jet flowing in the quark-gluon plasma fluid,”*
PAN Physics Seminar, Wayne State University, February 28th, 2020.
- [2] *“Medium response to jets in heavy ion collisions,”*
PAN Physics Seminar, Wayne State University, November 10th, 2017.
- [3] *“Full jet with hydrodynamic medium response in relativistic heavy-ion collisions,”*
Theory Seminar, Nuclear Theory Group at Lawrence Berkeley National Laboratory, February 24th, 2017.
- [4] *“Full jet with hydrodynamic response in QGP,”*
Seminar at Particle Theory Group, Chuo University, January 20th, 2017.
- [5] *“Full jet with hydrodynamic response in QGP,”*
QHP seminar, RIKEN, 18 January 2017.
- [6] *“Jet induced flow in quark-gluon plasma,”*
Nuclear theory seminar, Central China Normal University, March 21st, 2016.
- [7] *“Hydrodynamic response to jet energy loss,”*
Colloquium, Nuclear Theory Group, Kyoto University, October 14th, 2015.
- [8] *“Hydrodynamic response to jet propagation in quark-gluon plasma,”*
Nuclear theory seminar, Central China Normal University, March 11th, 2015.
- [9] *“Flow induced by jets in QGP fluid,”*
Seminar, Nuclear Theory Group, Osaka University, July 22rd, 2014.
- [10] *“Medium response in asymmetric di-jet events from full 3-D hydro,”*
QCD journal clubs, Institut de physique théorique de Saclay, March 25th, 2014.
- [11] *“Medium response in asymmetric di-jet events from full 3-D hydro,”*
Seminar, IGFAE, Universidad de Santiago de Compostela, March 20th, 2014.