Yasuki Tachibana

Akita International University, Yuwa, Akita-city, 010-1292 Japan

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Personal Details

First Name	Yasuki
Last Name	Tachibana
Nationality	Japan

Position & Affiliation

Assistant Professor

Golbal Connectivity Program, Faculty of International Liberal Arts,
Akita International University

Research Interests

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

Employment

Apr. 2020–	Assistant Professor Faculty of International Liberal Arts, Akita International University
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)

Other Experiences

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

Research Collaboration

Oct. 2017– JETSCAPE Collaboration [National Science Foundation (NSF) funded]
Convener of Physics Modeling Working Group [Jun. 2020–]

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.)

Grants

Apr. 2022–Mar. 2025 Principal Investigator
Grant-in-Aid for Early-Career Scientists, Grant No. 22K14041
"Jet thermalization in quark-gluon plasma"
Japan Society for the Promotion of Science (JSPS)
JPY 3,500,000

Apr. 2020–Mar. 2021 Co-Investigator (Principal Investigator: Tetsufumi Hirano)
Grant-in-Aid for Scientific Research (B), Grant No. 17H02900
"Development of unified model for high-energy nuclear collisions and physics of quark gluon plasma"
Japan Society for the Promotion of Science (JSPS)
JPY 600,000

Apr. 2013–Mar. 2014 Principal Investigator
Grant-in-Aid for JSPS Fellows, Grant No. 13J02554
"Integration of jet and QGP fluiddynamics in high-energy heavy-ion collisions"
Japan Society for the Promotion of Science (JSPS)
JPY 2,200,000

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

Community Services

Referee for: Physical Review Letters (*American Physical Society*)
Phisical Review C (*American Physical Society*)
Nuclear Physics A (*Elsevier*)
Chinese Physics C (*Chinese Physical Society*)

Organizer for: *SoftJet 2024* (International Workshop)
September 28 and 29, 2024, University of Tokyo, Japan
Co-Chair

Hard Probes 2024 (International Conference)
September 22–27, 2024, Nagasaki, Japan
Local Organizing Committee, *Chair of Scientific Program Committee*

Teaching Experiences

• Lectures (in English)

–At Akita International University–

Sep. 2024– Lecture for Undergraduate Class *"Math for Liberal Arts"*
- Teach logic, set theory, and probabilities for undergraduate students.
- Total number of class hours is 30† for each class.

Apr. 2024– Lecture for Undergraduate Class *"Linear Algebra"*
- Teach linear algebra for undergraduate students.
- Total number of class hours is 30† for each class.

Apr. 2020– Lecture for Undergraduate Class *"College Algebra"*
- Teach basics of algebra for undergraduate students.
- Total number of class hours is 30† for each class.

Sep. 2020– Lecture for Undergraduate Class *"Culculus"*
- Teach basics of calculus for undergraduate students.
- Total number of class hours per year is 30† for each class.

Sep. 2020– Lecture for Undergraduate Class *"Information Science"*
- Teach basics of computer science and information theory for undergraduate students.
- Total number of class hours per year is 30† for each class.

†Equivalent to 37.5 hours (75 min/class). Teach 6–8 classes per academic year.

• 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 class hours is 15* including midterm and term-end examinations.

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 class 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

Jul. 2024	Wayne State University	(Host: *Prof. Abhijit Majumder*)
Mar. 2019	Central China Normal University	(Hosts: *Prof. Guang-You Qin*)
May 2017	Institute for Nuclear Theory	(INT Program INT-17-1b)
Feb. 2017	Lawrence Berkeley National Laboratory	(Host: *Prof. Xin-Nian Wang*)
Mar. 2015	Central China Normal University	(Hosts: *Prof. Xin-Nian Wang and Prof. Guang-You Qin*)
Mar. 2014	Institut de physique théorique de Saclay	(Host: *Prof. Jean-Yves Ollitrault*)
Mar. 2014	Universidad de Santiago de Compostela	(Host: *Prof. Carlos A. Salgado*)

Computer Skills

Operating Systems	Macintosh, Linux, Microsoft Windows
Programming Languages	C/C++, Python, JavaScript (Google Apps Script), Perl
Softwares	JETSCAPE, Root, Pythia, FastJet

Languages Skill

Japanese	Native
English	Fluent

Publications

- Papers (selected)

–Published Papers–

[1] Y. Tachibana, A. Kumar, A. Majumder *et al.* [JETSCAPE],
"Hard jet substructure in a multistage approach," Phys. Rev. C **110**, no.4, 044907 (2024).

[2] A. Kumar, Y. Tachibana, C. Sirimanna *et al.* [JETSCAPE],
"Inclusive jet and hadron suppression in a multistage approach," Phys. Rev. C **107**, no.3, 034911 (2023).

[3] Y. Kanakubo, Y. Tachibana and T. Hirano,
"Nonequilibrium components in the region of very low transverse momentum in high-energy nuclear collisions," Phys. Rev. C **106**, no.5, 054908 (2022) Editors' Suggestion [arXiv:2207.13966 [nucl-th]].

[4] Y. Kanakubo, Y. Tachibana and T. Hirano,
"Interplay between core and corona components in high-energy nuclear collisions," Phys. Rev. C **105**, no.2, 024905 (2022) [arXiv:2108.07943 [nucl-th]].

[5] Y. Tachibana, C. Shen and A. Majumder,
"Bulk medium evolution has considerable effects on jet observables," Phys. Rev. C **106**, no.2, L021902 (2022) Editors' Suggestion [arXiv:2001.08321 [nucl-th]].

[6] 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]].

[7] A. Kumar, Y. Tachibana, D. Pablos, C. Sirimanna, R. J. Fries *et al.* [JETSCAPE],
"JETSCAPE framework: $p + p$ results," Phys. Rev. C **102**, no.5, 054906 (2020) [arXiv:1910.05481 [nucl-th]].

[8] 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**, 135181 (2020) [arXiv:1906.09562 [nucl-th]].

[9] 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]].

[10] M. Okai, K. Kawaguchi, Y. Tachibana and T. Hirano,
"New approach to initializing hydrodynamic fields and mini-jet propagation in quark-gluon fluids," Phys. Rev. C **95**, no.5, 054914 (2017) [arXiv:1702.07541 [nucl-th]].

[11] Y. Tachibana, N. B. Chang and G. Y. Qin,
"Full jet in quark-gluon plasma with hydrodynamic medium response," Phys. Rev. C **95**, no.4, 044909 (2017) Editors' Suggestion [arXiv:1701.07951 [nucl-th]].

[12] Y. Tachibana and T. Hirano,
"Interplay between Mach cone and radial expansion and its signal in γ-jet events," Phys. Rev. C **93**, no.5, 054907 (2016) [arXiv:1510.06966 [nucl-th]].

[13] Y. Tachibana and T. Hirano,
"Momentum transport away from a jet in an expanding nuclear medium," Phys. Rev. C **90**, no.2, 021902 (2014) [arXiv:1402.6469 [nucl-th]].

Presentations

• Invited Talks

–International–

[1] "Dynamical Core-Corona Initialization Model for High Energy Nuclear Collisions,"
ExHIC-p workshop on polarization phenomena in nuclear collisions,
Institute of Physics, Academia Sinica, Taipei, Taiwan, March 15th, 2024.

[2] "Modification of hard and soft components of jets,"
Sixth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, November 27th, 2023.

[3] "Jets and medium response (theory),"
ATHIC 2023, Hiroshima, Japan, April 24th, 2023.

[4] "Overview and recent progress on JETSCAPE,"
Workshop: Jet Physics: From RHIC/LHC to EIC, Center for Frontiers in Nuclear Science, Stony Brook Univ. [Online], June 29th, 2022
(for the JETSCAPE Collaboration).

[5] "Medium response to jets in JETSCAPE,"
Jet Quenching In The Quark-Gluon Plasma, ECT*, Trento, Italy, June 15th, 2022
(for the JETSCAPE Collaboration).

[6] "Hydrodynamic response to jets,"
Probing QCD at High Energy and Density with Jets (INT Program 21-2b),
Institute for Nuclear Theory, University of Washington [Online], July 27th, 2021.

[7] "Jet back reaction on the medium,"
Hard Probes 2020, The University of Texas at Austin [Switched to Online], June 3rd, 2020.

[8] "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.

[9] "Status of JETSCAPE,"
2019 RHIC & AGS Annual Users' Meeting, Brookhaven National Laboratory, New York, June 4th, 2019
(for the JETSCAPE Collaboration).

[10] "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.

[11] "Jets with medium response,"
The Definition of Jets in a Large Background, RIKEN BNL Research Center, New York, June 26th, 2018.

[12] "Medium response to jet-induced excitation: theory overview,"
Quark Matter 2018, Venice, May 18th, 2018.

[13] "Medium response to jets in heavy ion collisions,"
ISMD 2017, Tlaxcala City, Mexico, September 15th, 2017.

[14] "Jet medium interactions,"
ATHIC 2016, New Delhi, India, February 19th, 2016.

[15] "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.

[16] "Emission of Low Momentum Particles at Large Angles from Jet,"
Quark Matter 2012, Washington D.C., August 18th 2012.

–Domestic (given in Japanese)–

[17] “Exploring the Interplay Between Jet Showers and Quark-Gluon Plasma Fluid via Heavy-Ion Collisions,” Symposium “Exploring the creation of matter and structure in the universe from extreme non-equilibrium phenomena”, Spring meeting of Physics Society of Japan 2024, Online, March 20, 2024.

[18] “Recent aspects of quark-gluon plasma through high-energy nuclear collisions,” Symposium “The Next Generation of High-Energy Heavy-Ion Collisions: What Is Understood and What Should Be Understood?,” Spring meeting of Physics Society of Japan 2023, Online, March 22nd, 2023.

[19] “Summary of Hard Probe-related Talks in Quark Matter 2022,” 39th Heavy Ion Cafe & 35th Heavy Ion Pub Joint Workshop “Post QM”, KMI, Nagoya Univ., April 30th, 2022.

[20] “Fluid+Jets,” Workshop towards understanding the space-time evolution of heavy-ion collisions by modeling the QCD phase transition and QGP production from theoretical and experimental approaches, Online, September 24th, 2021.

[21] “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.

● Invited Lecture Talks

–International–

[22] “Jet-medium excitation hands-on session [Hands-on Session],” JETSCAPE Online Summer School 2022, Online, August 1st, 2022.

[23] “Jet physics [Hands-on Session],” JETSCAPE Online Summer School 2021, Online, July 26th, 2021.

[24] “Medium Excitation by Jets,” JETSCAPE Online Summer School 2021, Online, July 23rd, 2021.

[25] “Medium Excitation by Jets [Hands-on Session],” JETSCAPE Online Summer School 2020, Online, July 20th, 2020.

[26] “Medium Excitation by Jets,” JETSCAPE Online Summer School 2020, Online, July 17th, 2020.

–Domestic (given in Japanese)–

[27] “Jet (Overview and Theory),” Tutorial workshop on physics in high-energy heavy-ion collisions, Osaka University, August 6th, 2024.

[28] “Phenomenology of Quark-gluon Plasma and Jet in Relativistic Heavy-ion Collisions,” Extended lecture, Particle and Hadron Theory Group, Department of Physics, Hiroshima University, November 17-18th, 2022.

● Contributed Talks

–International–

[29] “Extraction of jet-medium interaction details through jet substructure for inclusive and gamma-tagged jets,” Hard Probes 2024, Nagasaki, Japan, September 23rd, 2024 (for the JETSCAPE Collaboration).

[30] “Effects of multi-scale jet-medium interactions on jet substructures,” Hard Probes 2023, Aschaffenburg, Germany, March 29th, 2023 (for the JETSCAPE Collaboration).

[31] “Comprehensive study of multi-scale jet-medium interaction,” Quark Matter 2022, Kraków, April 5th, 2022 (for the JETSCAPE Collaboration).

[32] “Jets: back reaction onto the medium,” The 38th Heavy Ion Cafe, Online, September 18th, 2020.

[33] “Medium response and bulk fluid-velocity effect in jet quenching,”
3rd JETSCAPE Winter School and Workshop 2020,
University of Tennessee Knoxville [Switched to Online], March 19th, 2020.

[34] “Hydrodynamic response to jets with a source based on causal diffusion,”
Quark Matter 2019, Wuhan, China, November 5th, 2019 (for the JETSCAPE Collaboration).

[35] “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).

[36] “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).

[37] “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.

[38] “Jet modification in QGP and hydrodynamic medium response,”
Santa Fe Jets and Heavy Flavor Workshop, Santa Fe, February 14th, 2017

[39] “Effect of hydrodynamic response in QGP on full jet,”
Quark Matter 2017, Chicago, February 8th, 2017.

[40] “Full jet including hydrodynamic response in heavy ion collisions,”
The 32nd Heavy Ion Cafe, RIKEN, January 21st, 2017.

[41] “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.

[42] “Flow excited by full jet shower in QGP fluid and its effect on jet shape,”
Hard Probes 2016, Wuhan, China, September 25th, 2016.

[43] “Interplay between Mach cone and radial expansion in jet events,”
Quark Matter 2015, Kobe, Japan, September 28th, 2015.

[44] “Hydrodynamic excitation by jets in the expanding QGP,”
Hard Probes 2015, McGill University, Montréal, June 30th, 2015.

[45] “Collective dynamics in dijet+QGP-fluid system,”
Fourth Joint Meeting of the Nuclear Physics Divisions of the APS and the Physical Society of Japan,
Waikoloa, Hawaii, October 9th, 2014.

[46] “Momentum flow in dijet+QGP-fluid system,”
ATHIC 2014, Osaka University, August 6th, 2014.

[47] “Collective flow induced by energetic partons in heavy-ion collisions,”
The 26th Heavy Ion Cafe, The University of Tokyo, July 19th, 2014.

[48] “Di-jet asymmetric momentum transported by QGP fluid,”
Hard Probes 2013, Stellenbosch Institute for Advanced Study, November 7th, 2013.

[49] “Collective Flow in the QGP Induced by Jets,”
Phenomenology and Experiments at RHIC and LHC, KMI, Nagoya University, September 25th, 2012.

[50] “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 (given in Japanese)–

[51] “Hydrodynamic response to jet quenching in QGP,”
HadNucl2015, KEK, 26 November 2015.

[52] “Transport of momenta from a jet in an expanding QGP fluid,”
Autumn Meeting of Physical Society of Japan 2013, Kochi University, 21 September 2013.

[53] “Flows in the QGP Fluid Induced by Jets,”
Autumn Meeting of Physical Society of Japan 2012, Kyoto Sangyo University, 12 September 2012.

[54] “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–

[55] “Jets as sources of acoustic probes for flowing quark-gluon plasma,”
Quark Matter 2022, Kraków, March 6th, 2022.

[56] “Interference effect between jet-induced flows in dijet events,”
Quark Matter 2018, Venice, May 5th, 2018.

[57] “Medium response in asymmetric di-jet events from full 3-D hydro,”
Quark Matter 2014, Darmstadt, May 20th, 2014.

[58] “Emission of Low Momentum Particles at Large Angles from Jet,”
Quark Matter 2012, Washington D.C., August 16th, 2012.