Yasuki Tachibana

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

ytachibana@aiu.ac.jp

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/X-SCAPE 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. 2024 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

Apr. 2010–Mar. 2012

Teaching Experiences

• Lectures (in English)

–At Akita International University–

Apr. 2020– Lecture for Undergraduate Class *"College Algebra"*
- Taught basics of algebra for undergraduate students.
- Took charge of 4 classes per year (35 students on average in each class).
- Total number of school hours is 30† for each class.

Sep. 2020– Lecture for Undergraduate Class *"Culculus"*
- Taught basics of calculus for undergraduate students.
- Took charge of 1 class per year (15 students on average in each class).
- Total number of school hours per year is 30† for each class.

Sep. 2020– Lecture for Undergraduate Class *"Information Science"*
- Taught basics of computer science and information theory for undergraduate students.
- Took charge of 1 class per year (15 students on average in each class).
- Total number of school hours per year is 30† for each class.

†Equivalent to 37.5 hours (75 min/class).

• 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.

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: *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*)

Publications

- Papers

[1] Y. Kanakubo, Y. Tachibana and T. Hirano,
"Non-equilibrium components in very low transverse momentum region in high-energy nuclear collisions,"
(Accepted by Phys. Rev. C) [arXiv:2207.13966 [nucl-th]].

[2] A. Kumar, Y. Tachibana, C. Sirimanna, G. Vujanovic, S. Cao, A. Majumder *et al.* [JETSCAPE Collaboration],
"Inclusive Jet and Hadron Suppression in a Multi-Stage Approach,"
[arXiv:2204.01163 [hep-ph]].

[3] Y. KanakuboY. 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]].

[4] Y. Tachibana, C. Shen and A. Majumder,
"Bulk medium evolution has considerable effects on jet observables,"
Phys. Rev. C **106**, L021902 (2022) Editors' Suggestion [arXiv:2001.08321 [nucl-th]].

[5] 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]].

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

[7] 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]].

[8] J. H. Putschke, K. Kauder, E. Khalaj *et al.* [JETSCAPE Collaboration],
"The JETSCAPE framework," [arXiv:1903.07706 [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,
"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]].

[11] 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]].

[12] 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]].

[13] 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–

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

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

[3] *'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.

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

[5] *"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.

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

[7] *"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.

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

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

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

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

[12] *"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.

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

–Domestic (talks given in Japanese)–

[1] "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.

[2] *"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.

[3] *"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–

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

[2] *"Jet physics [Hands-on Session],"*
JETSCAPE Online Summer School 2021, Online, July 26th, 2021.

[3] *"Medium Excitation by Jets,"*
JETSCAPE Online Summer School 2021, Online, July 23rd, 2021.

[4] *"Medium Excitation by Jets [Hands-on Session],"*
JETSCAPE Online Summer School 2020, Online, July 20th, 2020.

[5] *"Medium Excitation by Jets,"*
JETSCAPE Online Summer School 2020, Online, July 17th, 2020.

● Contributed Talks

–International–

[1] *"Comprehensive study of multi-scale jet-medium interaction,"*
Quark Matter 2022, Kraków, April 5th, 2022.

[2] *"Jets: back reaction onto the medium,"*
The 38th Heavy Ion Cafe, Online, September 18th, 2020.

[3] *"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.

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

[5] *"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).

[6] *"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).

[7] *"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.

[8] *"Jet modification in QGP and hydrodynamic medium response,"*
Santa Fe Jets and Heavy Flavor Workshop, Santa Fe, February 14th, 2017

[9] *"Effect of hydrodynamic response in QGP on full jet,"*
Quark Matter 2017, Chicago, February 8th, 2017.

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

[11] *"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.

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

[13] *"Interplay between Mach cone and radial expansion in jet events,"*
Quark Matter 2015, Kobe, Japan, September 28th, 2015.

[14] *"Hydrodynamic excitation by jets in the expanding QGP,"*
Hard Probes 2015, McGill University, Montréal, June 30th, 2015.

[15] *"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.

[16] *"Momentum flow in dijet+QGP-fluid system,"*
ATHIC 2014, Osaka University, August 6th, 2014.

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

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

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

[20] *"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 (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–

[1] *"Jets as sources of acoustic probes for flowing quark-gluon plasma,"*
Quark Matter 2022, Kraków, March 6th, 2022.

[2] *"Interference effect between jet-induced flows in dijet events,"*
Quark Matter 2018, Venice, May 5th, 2018.

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

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

● Seminars & Other Talks

[1] *"Description of medium response to jet propagation in quark-gluon plasma fluid,"*
RBRC seminar, RIKEN BNL Research Center [Online], October 14th, 2021.

[2] *"JETSCAPE Physics Working Group Year 4 Accomplishments,"*
The JETSCAPE/X-SCAPE Collaboration Meeting 2020, Online, August 13th, 2020.

[3] *"Jet flowing in the quark-gluon plasma fluid,"*
PAN Physics Seminar, Wayne State University, February 28th, 2020.

[4] *"Medium response to jets in heavy ion collisions,"*
PAN Physics Seminar, Wayne State University, November 10th, 2017.

[5] *"Full jet with hydrodynamic medium response in relativistic heavy-ion collisions,"*
Theory Seminar, Nuclear Theory Group at Lawrence Berkeley National Laboratory, February 24th, 2017.

[6] *"Full jet with hydrodynamic response in QGP,"*
Seminar at Particle Theory Group, Chuo University, January 20th, 2017.

[7] *"Full jet with hydrodynamic response in QGP,"*
QHP seminar, RIKEN, 18 January 2017.

[8] *"Jet induced flow in quark-gluon plasma,"*
Nuclear theory seminar, Central China Normal University, March 21st, 2016.

[9] *"Hydrodynamic response to jet energy loss,"*
Colloquium, Nuclear Theory Group, Kyoto University, October 14th, 2015.

[10] *"Hydrodynamic response to jet propagation in quark-gluon plasma ,"*
Nuclear theory seminar, Central China Normal University, March 11th, 2015.

[11] *"Flow induced by jets in QGP fluid,"*
Seminar, Nuclear Theory Group, Osaka University, July 22rd, 2014.

[12] *"Medium response in asymmetric di-jet events from full 3-D hydro,"*
QCD journal clubs, Institut de physique théorique de Saclay, March 25th, 2014.

[13] *"Medium response in asymmetric di-jet events from full 3-D hydro,"*
Seminar, IGFAE, Universidad de Santiago de Compostela, March 20th, 2014.