

Aleksas Mazeliauskas

Theoretical Physics Department

CERN Building 4/2-065
CH-1211 Geneva 23
Switzerland

Email

aleksas.mazeliauskas@cern.ch

Phone

+41 22 76 73204

Website

aleksas.eu

Nationality

lithuanian

Professional experience

- 2019– Senior research fellow, **Theoretical Physics Department, CERN**
Research on condensed QCD matter, Standard Model processes in nuclear environment, future ion experiments at the LHC.
- 2017–2019 Postdoctoral researcher, **Institute for Theoretical Physics, Heidelberg University**
Member of collaborative research center SFB 1225 *Isolated quantum systems and universality in extreme conditions*.
Work on non-equilibrium QCD physics using quark and gluon kinetic theory, pre-equilibrium kinetic propagator $K\bar{0}MP\bar{0}ST$, resonance decay code `FastReso`.
- 2014–2017 Research assistant, **Nuclear Theory Group, Stony Brook University**
PhD dissertation work under supervision of Prof. Derek Teaney, *Fluctuations in ultra-relativistic heavy ion collisions*

Education

- 2012–2017 **Stony Brook University**, United States, Doctor of Philosophy in Physics
Max Dresden Prize for outstanding theoretical thesis, degree awarded on 19/05/2017
- 2011–2012 **University of Cambridge**, United Kingdom, Master of Mathematics (Part III Maths)
graduated with distinction
- 2008–2011 **University of Cambridge**, United Kingdom, Bachelor of Arts (Mathematical Tripos)
1st class degree

Awards

- 09/11/2019 Nuclear Physics A Young Scientist Award for the best theory talk at Quark Matter 2019
- 02/05/2017 Max Dresden Prize for outstanding theoretical thesis
- 25/07/2016 APS FGSA Travel Award for Excellence in Graduate Research
- 23/05/2013 David Fox award for the outstanding Teaching Assistant

Professional services

Events organised

- 2021 Co-organiser of (virtual) workshop on **Opportunities of OO and pO collisions at the LHC**, 4-10 Feb 2021 and the co-author of the summary report.
Co-organiser of (virtual) **First Lithuanian Particle Physics Meeting**, 9 March 2021.
- 2019 Convener of discussion group on "Connections between QGP-like observables in small systems" at **International Workshop on QCD Challenges from pp to AA**, 19-23 Aug 2019, Lund, Sweden, and the editor of the summary report.
Convener of discussion group on "Implementations of critical dynamics" at **EMMI Rapid Reaction Task Force: Dynamics of critical fluctuations**, 8-12 April 2019, Darmstadt, Germany, and the editor of the summary report.

Refereeing

Physical Review Letters, Physical Review C and D, Physics Letters B, Nuclear Physics B, Journal of High Energy Physics

Languages

Lithuanian	native, enthusiastic teacher	French	elementary (A2)
English	fluent, higher education in English	Russian	basic conversational
German	upper intermediate (B2)	Chinese	beginner, passed HSK level II test

Programming

Programming	Extensive numerically oriented coding in C++ and Python, previous experience with Fortran and Matlab, good working knowledge of Mathematica
General IT	Git (source code management), L ^A T _E X (word processing), Inkscape (vector graphics), GNU/Linux (operating system), Gnuplot (graphing), HTML5 (web building)

Invited presentations

- 27/07/2021 upcoming review talk at **European Physical Society Conference on High Energy Physics** (online) on *High-energy QCD Matter Theory*, Hamburg, Germany
- 28/06/2021 upcoming plenary talk at **Strong and Electro-Weak Matter Conference** on *Matching glasma to hydro via kinetic theory*, Paris, France
- 03/03/2021 talk at **145th LHC Committee Meeting** (online) on *Opportunities of 00 and p0 collisions at the LHC*, Geneva, Switzerland
- 15/01/2021 plenary talk at **VI Initial Stages Conference** (online) on *What do we learn from small systems about the physics of heavy ion collisions?*, Rehovot, Israel
- 24/09/2020 talk at **ALICE Physics Week (online)** on *Partonic rescattering in light nucleus collisions*, Bucharest, Hungary
- 28/05/2020 talk at **VIII Large Hadron Collider Physics Conference (online)** on *Equilibration of QGP in small systems*, Paris, France
- 06/12/2019 talk at **XIX Zimányi School Winter Workshop** on *Pre-equilibrium phenomena in Quark Gluon Plasma*, Budapest, Hungary
- 25/11/2019 talk at **Theoretical Foundations of Relativistic Hydrodynamics Workshop** on *Pre-scaling, hydrodynamic attractors and entropy production in heavy ion collisions*, Banff, Canada
- 01/11/2019 talk at **New Development of Hydrodynamics and its applications in Heavy-ion Collisions Workshop** on *Hydrodynamic attractors, initial state energy and particle production in relativistic nuclear collisions*, Shanghai, China
- 13/09/2019 talk at **XLIX International Symposium on Multiparticle Dynamics** on *Equilibration in Quark Gluon Plasma*, Santa Fe, New Mexico, USA
- 25/06/2019 plenary talk at **V Initial Stages Conference** on *Matching of initial conditions to hydro evolution*, New York, USA
- 06/04/2019 talk at **XIV Polish Workshop on Relativistic Heavy-Ion Collisions** on *Chemical equilibration in hadronic collisions*, Krakow, Poland
- 01/08/2018 parallel talk at **XIII Quark Confinement and the Hadron Spectrum Conference**, *2+1D simulations of pre-equilibrium stage with QCD kinetic theory*, Dublin, Ireland
- 18/05/2018 plenary talk at **XXVII Quark Matter Conference** on *Initial conditions for nuclear collisions: theory overview*, Venice, Italy

- 02/10/2017 talk at **XII High-pT Physics Workshop** on *Initial conditions for heavy ion collisions*, Bergen, Norway
- 15/06/2017 talk at **XII Workshop on Particle Correlations and Femtoscopy** on *Kinetic theory equilibration for realistic heavy ion initial conditions*, Amsterdam, The Netherlands
- 06/03/2015 talk at **Collectivity in Small Colliding Systems with High Multiplicity Workshop** on *Principal Component Analysis and Subleading Flow*, Brookhaven National Lab, New York, United States

Contributed presentations

- 09/03/2021 **First Lithuanian Particle Physics Meeting** (online), Vilnius, Lithuania
- 03/06/2020 **X Hard Probes** (online), Austin, USA
- 06/11/2019 **XXVIII Quark Matter Conference**, Wuhan, China, BEST THEORY TALK
- 22/09/2019 **Quantum Systems in Extreme Conditions**, Heidelberg, Germany
- 10/06/2019 **XVIII Strangness in Quark Matter**, Bari, Italy
- 14/01/2019 **XLVII Workshop on Gross Properties of Nuclei and Nuclear Excitations**, Hirschegg, Austria
- 23/05/2019 **Origins of Correlations in High Energy Collisions**, INT, Seattle, Washington, United States
- 09/04/2019 **EMMI RRTF: Dynamics of critical fluctuations**, Darmstadt, Germany
- 02/10/2018 **IX Hard Probes conference**, Aix-Les-Bains, France
- 27/08/2018 **Probing the Quark-Gluon Plasma with collective phenomena and heavy quarks**, MIAPP, Munich, Germany
- 19/09/2017 **IV Initial Stages**, Krakow, Poland
- 08/08/2017 **Critical Point and Onset of Deconfinement**, Stony Brook, New York, United States
- 07/02/2017 **XXVI Quark Matter**, Chicago, Illinois, United States
- 19/09/2016 **VII Hot Quarks**, South Padre Island, Texas, United States
- 25/05/2016 **III Initial Stages**, Lisbon, Portugal
- 22/07/2015 **Correlations and Fluctuations in p+A and A+A Collisions**, INT, Seattle, Washington, United States
- 27/03/2015 **Ohio-Region APS meeting**, Kent, Ohio, United States

List of courses taught

Heidelberg University

- 2018-2019 **Co-Head tutor** for Quantum Field Theory and Advanced Quantum Field Theory courses. Responsible for preparing homework and exam problems, typesetting lecture notes and overseeing other tutors (winter and summer semesters).
- 2018 **Co-organiser** of a master level student lead seminar on QCD matter in heavy ion collisions (summer semester).
- 2017-2018 **Head tutor** for Quantum Field Theory course. Responsible for preparing homework, exam problems and overseeing nine other tutors (winter semester).

Stony Brook University

- 2014 **Recitation instructor** for calculus based undergraduate electromagnetism and mechanics courses (2 semesters). Selected student responses:
- I think the instructor was more valuable than the course itself.*
- I would love to see him become a professor one day and attain his career goals.*
- He would do a fantastic job in teaching the entire course.*

2012–2013 **Teaching assistant** for undergraduate mechanics laboratory (2 semesters), received David Fox award for outstanding Teaching Assistant.

National Student Academy (NMA)

2020– Head of Physics section at NMA – additional training school for gifted high-school children in Lithuania. Responsible for the distant learning program and in-person sessions.

2008–2011 Trained a number of young gifted Lithuanian students for physics competitions through distant learning programs and lecturing at summer schools.

Mentoring

2020 Supervised a visiting PhD student Robin Törnkvist (Lund University)

2019 Informal mentoring of PhD students Oscar Garcia-Montero (Heidelberg University), Giuliano Giacalone (Université Paris Saclay) and Aleksandr Mikheev (Heidelberg University).

2018 **Co-supervisor** of a bachelor project by Paul Wiesemeyer (Heidelberg University) on radiative photon production in QGP.

Outreach

2021 Conducted a virtual CMS tour and gave a talk about CERN during NMA winter session.

2020 Gave two talks to high-school children in Lithuania about science and work at CERN.

2019 Was interviewed about my work for French science magazine: J.-B. Veyrieras, *Découverte de la première flèche du temps*, Science & Vie, n°1228 (2020)

Prepared physics questions for an on-line science quiz competition *Išmanioji diena* held on 10/10/2019, Lithuania

2017 Prepared two introductory problem sets on elementary particles for high school students at Vilnius University Particle physics outreach group

2008-2013 One of founders and organisers of student-run physics team competition at Vilnius Lyceum, created a number of physics problems for the competition.

2007-2012 Active alumnus of NMA; spoke twice on Lithuanian national TV about education of talented children.

List of publications

My publication record four years after PhD stands at over twenty articles, a review and two community reports. Out of those papers, five were accepted for publication at **Physical Review Letters** and two publications were selected as EDITORS' SUGGESTION (in Phys. Rev. Lett. and Phys. Rev. D). In addition, I was a co-editor for two community reports of topical workshops and I co-wrote a review on *Thermalization in QCD* for **Reviews of Modern Physics**.

2021

1. C. Duhr, A. Huss, A. Mazeliauskas, R. Szafron, *Analysis of Bayesian estimates for missing higher orders in perturbative calculations*, will appear soon
2. A. Andronic, P. Braun-Munzinger, M.K. Köhler, A. Mazeliauskas, K. Redlich, J. Stachel, V. Viskovic, *The multiple-charm hierarchy in the statistical hadronization model*, arXiv:2104.12754
3. A. Kurkela, A. Mazeliauskas, R. Törnkvist, *Collective flow in single-hit QCD kinetic theory*, arXiv:2104.08179
4. J. Brewer, A. Mazeliauskas, W. van der Schee, *Opportunities of 00 and $p0$ collisions at the LHC*, arXiv:2103.01939

2020

5. A. Huss, A. Kurkela, [A. Mazeliauskas](#), R. Paatelainen, W. van der Schee, U. Wiedemann, *Predicting parton energy loss in small collision systems*, accepted for publication in **Phys.Rev.C** arXiv:2007.13758
6. A. Huss, A. Kurkela, [A. Mazeliauskas](#), R. Paatelainen, W. van der Schee, U. Wiedemann, *Discovering partonic rescattering in light nucleus collisions*, accepted for publication in **Phys.Rev.Lett.**, arXiv:2007.13754
7. J. Berges, M.P. Heller, [A. Mazeliauskas](#), R. Venugopalan, *Thermalization in QCD: theoretical approaches, phenomenological applications, and interdisciplinary connections*, accepted for publication in **Rep.Mod.Phys.** arXiv:2005.12299
8. EDITOR FOR J. Adolfsson et al., *QCD Challenges from pp to A-A Collisions*, community report, **Eur.Phys.J.A** **56**, **11** (2020), arXiv:2003.10997
9. EDITOR FOR M. Bluhm et al., *Dynamics of critical fluctuations: Theory – phenomenology – heavy-ion collisions*, community report, **Nucl. Phys. A** 1003, 122016 (2002), arXiv:2001.08831

2019

10. O. Garcia-Montero, N. Löhner, [A. Mazeliauskas](#), J. Berges, and K. Reygers, *Probing the evolution of heavy-ion collisions using direct photon interferometry*, **Phys. Rev. C** 102, 024915 (2020), arXiv:1909.12246
11. D. Devetak, A. Dubla, S. Floerchinger, E. Grossi, [A. Mazeliauskas](#), S. Masciocchi, and I. Selyuzhenkov, *Global fluid fits to identified particle transverse momentum spectra from heavy-ion collisions at the Large Hadron Collider*, **JHEP** 2006 (2020) 44 arXiv:1909.10485
12. P. Hanus, [A. Mazeliauskas](#), and K. Reygers, *Entropy production in pp and Pb-Pb collisions at energies available at the CERN Large Hadron Collider*, **Phys. Rev. C** 100, 064903 (2019), arXiv:1908.02792
13. G. Giacalone, [A. Mazeliauskas](#) and S. Schlichting, *Hydrodynamic Attractors, Initial State Energy, and Particle Production in Relativistic Nuclear Collisions*, **Phys. Rev. Lett.** 123, 262301 (2019), arXiv:1908.02866
14. [A. Mazeliauskas](#) and V. Vislavicius, *Temperature and fluid velocity on the freeze-out surface from π , K , p spectra in pp, p-Pb and Pb-Pb collisions*, **Phys. Rev. C** 101, 014910 (2020), arXiv:1907.11059
15. W. Florkowski, A. Kumar, R. Ryblewski, and [A. Mazeliauskas](#), *Longitudinal spin polarization in a thermal model*, **Phys. Rev. C** **100**, 054907 (2019), arXiv:1904.00002

2018

16. A. Kurkela, [A. Mazeliauskas](#), *Chemical equilibration in weakly coupled QCD*, **Phys. Rev. D** 99, 054018 (2019), EDITORS' SUGGESTION, arXiv:1811.03068
17. A. Kurkela, [A. Mazeliauskas](#), *Chemical equilibration in hadronic collisions*, **Phys. Rev. Lett.** 122, 142301 (2019), arXiv:1811.03040
18. [A. Mazeliauskas](#), J. Berges, *Prescaling and far-from-equilibrium hydrodynamics in the quark-gluon plasma*, **Phys. Rev. Lett.** 122, 122301 (2019), arXiv:1810.10554
19. [A. Mazeliauskas](#), S. Floerchinger, E. Grossi, D. Teaney, *Fast resonance decays in nuclear collisions*, **Eur. Phys. J. C** (2019), arXiv:1809.11049
20. A. Kurkela, [A. Mazeliauskas](#), J.-F. Paquet, S. Schlichting and D. Teaney, *Matching the non-equilibrium initial stage of heavy ion collisions to hydrodynamics with QCD kinetic theory*, **Phys. Rev. Lett.** 122, 122302 (2019), EDITORS' SUGGESTION, arXiv:1805.01604
21. A. Kurkela, [A. Mazeliauskas](#), J.-F. Paquet, S. Schlichting and D. Teaney, *Effective kinetic description of event-by-event pre-equilibrium dynamics in high-energy heavy-ion collisions*, **Phys. Rev. C**, **99**, 034910 (2019), arXiv:1805.00961

pre-2018

22. Y. Akamatsu, [A. Mazeliauskas](#) and D. Teaney, *Bulk viscosity from hydrodynamic fluctuations with relativistic hydro-kinetic theory*, **Phys. Rev. C** 97, 024902 (2018), arXiv:1708.05657
23. Y. Akamatsu, [A. Mazeliauskas](#) and D. Teaney, *A kinetic regime of hydrodynamic fluctuations and long time tails for a Bjorken expansion*, **Phys. Rev. C**, 95, 014909 (2017), arXiv:1606.07742
24. L. Keegan, A. Kurkela, [A. Mazeliauskas](#) and D. Teaney, *Initial condition for hydrodynamics from weakly coupled pre-equilibrium evolution*, **JHEP** 1608 (2016) 171, arXiv:1605.04287
25. [A. Mazeliauskas](#) and D. Teaney, *Fluctuations of harmonic and radial flow in heavy ion collisions with principal components*, **Phys. Rev. C** 93, 024913 (2016), arXiv:1509.07492
26. [A. Mazeliauskas](#) and D. Teaney, *Subleading harmonic flows in hydrodynamic simulations of heavy ion collisions*, **Phys. Rev. C** 91, 044902 (2015), arXiv:1501.03138

Selected Conference proceedings

1. [A. Mazeliauskas](#), **Quark Matter 2018** *Initial conditions for nuclear collisions: theory overview*, Nucl. Phys. A 982 (2019), 134-141, arXiv:1807.05586