Curriculum vitae - Paul Romatschke

as of July 24, 2017

Personal Information

- Nationality: Austrian
- Current Address:
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Educational Background

- November 2003 Graduation to "Doktor der technischen Wissenschaften" with honors, Technical University of Vienna, Austria
- 04-06 Postdoctoral Position at Bielefeld University, Bielefeld, Germany
- 06-07 Postdoctoral Position at INT, University of Washington, Seattle, USA

Academic Employment History

- 07-10 Research Assistant Professor/INT 5-year fellow, University of Washington, Seattle, USA
- 10-11 Fellow, Frankfurt Institute for Advanced Studies (FIAS), Frankfurt, Germany
- 11-17 Assistant Professor, Department of Physics, University of Colorado Boulder, Boulder USA
- **currently (since 08/2017) Associate Professor**, Department of Physics, University of Colorado Boulder, Boulder USA

Teaching

Different Lecture Courses Taught

1. "**New Developments in Viscous Hydrodynamics**" (2 credits), University of Jyväskylä, Finland (Summer 2008)

2. "**Hydrodynamics and Transport Theory**" (4 credits), Johann-Wolfgang von Goethe Universität Frankfurt, Germany (Fall 2010)

3. "**Thermal Quantum Field Theory**" (4 credits), Johann-Wolfgang von Goethe Universität Frankfurt, Germany (Spring 2011)

4. "**Energy and the Environment**" (PHYS 3070, 3 credits), University of Colorado, Boulder, USA (Spring 2012)

5. "**Electromagnetism I for Graduate Students**" (PHYS 7310, 3 credits), University of Colorado, Boulder, USA (Fall 2012 & Fall 2013)

6. "**Electromagnetism II for Graduate Students**" (PHYS 7320, 3 credits), University of Colorado, Boulder, USA (Spring 2013)

7. "**Quantum Mechanics II for Graduate Students**" (PHYS 5260, 3 credits), University of Colorado, Boulder, USA (Spring 2015& Spring 2017)

8. "**Classical Electromagnetism**" (PHYS 3320, 3 credits), University of Colorado, Boulder, USA (Fall 2015)

9. "**Introduction to Modern Physics**" (PHYS 2170, 3 credits), University of Colorado, Boulder, USA (Spring 2016 & Fall 2016)

Current Supervision: U. of Colorado, Boulder

- 2017-current: **J. Mehlhaff, graduate student**
- 2015-current: **T. Ishii, postdoctoral researcher**
- 2013-current: **M. Habich, graduate student**
- 2015-current: **W. Lewis, graduate student**
- 2016-current: **R. Weller, undergraduate student**

Previous Student Supervision

- 2010-2011: **I. Sagert, postdoctoral researcher**, FIAS, Frankfurt, Germany; currently a postdoc at Indiana University
- 2010-2011: **B. Wu, postdoctoral researcher**, FIAS, Frankfurt, Germany; currently a postdoc at Ohio State University
- 2013-2016: **H. Bantilan, postdoctoral researcher**, U. Colorado, Boulder; currently a postdoc at University of Queen Mary/University of Cambridge, UK
- 2015-2016: **W. Xiang, postdoctoral researcher**, U. Colorado, Boulder; faculty at Guizhou University of Finance and Economics, Guyyang, China
- 2007-2009: **M. Luzum, graduate student**, co-supervision with G. Miller, U. of Washington, Seattle; **PhD 2009**, thesis was awarded the 2011 American Physical Society Dissertation Award in Nuclear Physics; currently a faculty member at the University of Sao Paolo, Brazil
- 2012-2013: **R. Young, graduate student**, U. Colorado, Boulder; **MS 2013**
- 2012-2016: **T. Gorda, graduate student**, U. Colorado, Boulder; **defended PhD thesis summer 2016**; currently a postdoc at Helsinki University
- 2010-2011: **M. Habich, undergraduate student**, FIAS, Frankfurt, Germany; **BS 2011**; currently a PhD student in physics at CU Boulder
- 2010-2011: **S. Henneberg, undergraduate student**, FIAS, Frankfurt, Germany; **BS 2011**; currently a postdoc at Max-Planck-Institute for Plasma Physics, Greifswald, Germany
- Summer 2013 **J.D. Hogg, undergraduate student**, CU Boulder; currently a PhD student at the Astronomy Department at the University of Maryland
- 2013-2015: **J. Brewer, undergraduate student**, CU Boulder, **BS 2015**; currently a PhD student at MIT

Honors and Awards

- 02/2012: Alfred P. Sloan Fellow 2012 (Sloan Foundation)
- 05/2012: Department of Energy Early Career Research Award

Recent Invited Talks

- "Modeling Heavy-Ion LHC experiments as collisions of black holes in AdS_5", **New Frontiers in Dynamical Gravity**, Cambridge, UK, March 2014
- "Strong Coupling Far-From-Equilibrium Thermalization for 'Nuclei'", **The Approach to Equilibrium in Strongly Interacting Matter**, Brookhaven National Laboratory, April 2014
- "Phenomenology from AdS/CFT pre-equilibrium flow in pA and AA", **Initial Stages in Heavy-Ion Collisions**, Napa Valley, Dec 2014
- "Simulation of Black Hole Collisions in AdS spacetimes", **Numerical Holography**, CERN, Dec 2014
- "Simulation of Black Hole Collisions in AdS spacetimes", **Holographic Methods for Strongly Coupled Systems**, Florence, Italy, April 2015
- "Collective flow without hydrodynamics", **Correlations and Fluctuations in p+A and A+A Collisions**, INT, University of Washington, Seattle July 2015
- "Experimental evidence for non-hydrodynamic modes", **Equilibration Mechanisms in Weakly and Strongly Coupled Quantum Field Theory**, INT, University of Washington, Seattle Aug 2015
- "Summary of other reasonable theoretical ideas" (plenary), **Quark Matter 2015**, Kobe, Japan, October 2015
- "Predictions of novel collective modes in trapped Fermi gases from Lifshitz black holes", **Numerical Methods for asymptotically AdS spaces**, Technion, Haifa, Israel, May 2016
- "Simulating Yang-Mills in 9+1 dimensions", **Numerical Relativity and Holography**, Santiago de Compostela, Spain, June 2016
- "String-theory Inspired Predictions for Novel Collective modes in Cold Atom Experiments", **Workshop on Non-Equilibrium Physics and Holography**, Oxford, U.K., July 2016
- "Non-Equilibrium Dynamics in Nuclear Collisions", **The Big Bang and little bangs**, CERN, August 2016
- "Do nuclear collisions create an equilibrated QGP", **Relativistic Hydrodynamics: Theory and Modern Applications**, Mainz, Germany, October 2016

- "Lattice Simulations of Yang-Mills in 10d and toroidal compactifications", **Quantum Gravity, String Theory and Holography**, Kyoto, Japan, April 2017

- "What do hydrodynamic fits to data tell us about QCD properties?", **Workshop on Flow in Small Systems**, Copenhagen, Denmark, May 2017

- "Creating QCD plasma droplets in p+p collisions at the LHC", **EPS-HEP 2017**, Venice, Italy, July 2017

Refereed Publications

1. P. Romatschke and M. Strickland, *Collective Modes of an Anisotropic Quark-Gluon Plasma*, **Phys.Rev.D68:036004, 2003**

2. A. Rebhan and P. Romatschke, *HTL Quasiparticle Models of Deconfined QCD at Finite Chemical Potential*, **Phys.Rev.D68:025022, 2003**

3. P. Romatschke and M. Strickland, *Energy Loss of a Heavy Fermion in an Anisotropic QED Plasma*, **Phys.Rev.D69:065005, 2004**

4. P. Romatschke and M. Strickland, *Collective Modes of an Anisotropic Quark-Gluon Plasma II*, **Phys.Rev.D70:116006, 2004**

5. P. Romatschke and M. Strickland, *Collisional Energy Loss of a Heavy Quark in an Anisotropic Quark-Gluon Plasma*, **Phys.Rev.D71:125008, 2005**

6. A. Rebhan, P. Romatschke and M. Strickland, *Hard-Loop Dynamics of Non-Abelian Plasma Instabilities*, **Phys.Rev.Lett.94:102303, 2005**

7. E.S. Fraga and P. Romatschke, *The Role of Quark Mass in Cold and Dense Perturbative QCD*, **Phys.Rev.D71:105014, 2005**

8. A. Rebhan, P. Romatschke and M. Strickland, *Dynamics of Quark-Gluon-Plasma Instabilities in Discretized Hard-Loop-Approximation*, **JHEP 0509:041, 2005**

9. P. Romatschke and R. Venugopalan, *Collective Non-Abelian Instabilities in a Melting Color Glass Condensate*, **Phys.Rev.Lett.96:062302, 2006**

10. R. Baier, P. Romatschke and U.A. Wiedemann, *Dissipative hydrodynamics and heavy ion collisions*, **Phys.Rev. C73:064903, 2006**

11. P. Romatschke and R. Venugopalan, *The Unstable Glasma*, **Phys.Rev. D74:045011, 2006**

12. P. Romatschke and A. Rebhan, *Plasma Instabilities in an Anisotropically Expanding Geometry*, **Phys.Rev.Lett. 97:252301, 2006**

13. P. Romatschke, *Momentum broadening in an anisotropic plasma*, **Phys.Rev. C75:014901, 2007**

14. R. Baier and P. Romatschke, *Causal viscous hydrodynamics for central heavy-ion collisions*, **Eur.Phys.J.C51:677-687, 2007**

15. M. Laine, O. Philipsen, P. Romatschke and M. Tassler, *Real-time static potential in hot QCD*, **JHEP 0703:054, 2007**

16. P. Romatschke, *Causal viscous hydrodynamics for central heavy-ion collisions. II. Meson spectra and HBT radii*, **Eur.Phys.J.C52:203-209, 2007**

17. P. Romatschke and U. Romatschke, *Viscosity information from relativistic nuclear collisions: How perfect is the fluid observed at RHIC?*, **Phys.Rev.Lett. 99:172301, 2007**

18. R. Baier, P. Romatschke, D.T. Son, M. Stephanov and A. Starinets, *Relativistic viscous hydrodynamics, conformal invariance, and holography*, **JHEP 0804:100, 2008**

19. D. Grumiller and P. Romatschke, *On the collision of two shock waves in AdS_5*, **JHEP 0808:027, 2008**

20. M. Luzum and P. Romatschke, *Conformal Relativistic Viscous Hydrodynamics: Applications to RHIC results at $\sqrt{s_{NN}} = 200$-GeV*, **Phys.Rev. C78:034915, 2008**

21. M. Luzum and P. Romatschke, *Viscous Hydrodynamic Predictions for Nuclear Collisions at the LHC*, **Phys.Rev.Lett. 103:262302, 2009**

22. P. Romatschke, *New Developments in Relativistic Viscous Hydrodynamics*, **Int.J.Mod.Phys.E19:1-53, 2010**

23. P. Romatschke and D.T. Son, *Spectral sum rules for the quark-gluon plasma*, **Phys.Rev. D80:065021, 2009**

24. P. Romatschke, *Relativistic Viscous Fluid Dynamics and Non-Equilibrium Entropy*, **Class.Quant.Grav.27:025006, 2010**

25. A. Kurkela, P. Romatschke and A. Vuorinen, *Cold Quark Matter*, **Phys.Rev.D81:105021, 2010**

26. P. Kovtun, G.D. Moore and P. Romatschke, *The stickiness of sound: An absolute lower limit on viscosity and the breakdown of second order relativistic hydrodynamics*, **Phys.Rev.D84:025006, 2011**

27. P. Romatschke, M. Mendoza and S. Succi, *A fully relativistic lattice Boltzmann algorithm*, **Phys.Rev.C84:034903, 2011**

28. Bin Wu and P. Romatschke, *Shock wave collisions in AdS5: approximate numerical solutions*, **Int.J.Mod.Phys. C22:1317-1342, 2011**

29. P. Romatschke, *Relativistic (Lattice) Boltzmann Equation with Non-Ideal Equation of State*, **Phys. Rev. D85:065012, 2012**

30. P. Romatschke and R. Young, *Implications of hydrodynamic fluctuations on the minimum shear viscosity of the dilute Fermi gas at unitarity*, **Phys.Rev. A87:053606, 2013**

31. P. Romatschke and J.D. Hogg, *Pre-Equilibrium Radial Flow from Central Shock-Wave Collisions in AdS_5*, **JHEP 1304:048, 2013**

32. W. van der Schee, P. Romatschke and S. Pratt, *A fully dynamical simulation of central nuclear collisions*, **Phys.Rev.Lett.111:222302, 2013**

33. A. Adare et al., *Examination whether heavy quarks carry information on the early-time coupling of the quark-gluon plasma*, **Phys.Rev. C90:024911, 2014**

34. J.L. Nagle et al., *Exploiting Intrinsic Triangular Geometry in Relativistic He^3+Au Collisions to Disentangle Medium Properties*, **Phys.Rev.Lett. 113:112301, 2014**

35. M. Habich and P. Romatschke, *Onset of cavitation in the quark-gluon plasma*, **JHEP 1412:054, 2014**

36. P. Kovtun, G.D. Moore and P. Romatschke, *Towards an effective action for relativistic dissipative hydrodynamics*, **JHEP 1407:123, 2014**

37. T. Gorda and P. Romatschke, *Precision studies of v_n fluctuations*, **Phys.Rev. C90:054908, 2014**

38. P. Arnold, W. van der Schee and P. Romatschke, *Absence of a local rest frame in far from equilibrium quantum matter*, **JHEP 1410:110, 2014**

39. M. Habich, J.L. Nagle and P. Romatschke, *Particle spectra and HBT radii for simulated central nuclear collisions of C + C, Al + Al, Cu + Cu, Au + Au, and Pb + Pb from $\sqrt{s}$=62.4 - 2760 GeV* , **Eur.Phys.J. C75:15, 2015**

40. H. Bantilan and P. Romatschke, *Simulation of Black Hole Collisions in Asymptotically Anti-de Sitter Spacetimes*, **Phys.Rev.Lett. 114 (2015) 8, 081601**

41. T. Gorda and P. Romatschke, *Equation of state in two-, three-, and four-color QCD at nonzero temperature and density*, **Phys.Rev. D92 (2015) 1, 014019**

42. P. Romatschke, *Light-Heavy Ion Collisions: A window into pre-equilibrium QCD dynamics?*, **Eur.Phys.J. C75 (2015) 7, 305**

43. P. Romatschke, *Collective flow without hydrodynamics: simulation results for relativistic ion collisions*, **Eur.Phys.J. C75 (2015) 9, 429**

44. J. Brewer, M. Mendoza, R.E. Young and P. Romatschke, *Lattice Boltzmann simulations of a strongly interacting two-dimensional Fermi gas*, **Phys.Rev. A93 (2016) 1, 013618**

45. J. Brewer and P. Romatschke, *Nonhydrodynamic Transport in Trapped Unitary Fermi Gases*, **Phys.Rev.Lett. 115 (2015) 19, 190404**

46. P. Romatschke, *Retarded correlators in kinetic theory: branch cuts, poles and hydrodynamic onset transitions*, **Eur.Phys.J. C77 (2016) 6, 352**

47. L. Keegan, A. Kurkela, P. Romatschke, W. van der Schee and Y. Zhu, *Weak and strong coupling equilibration in nonabelian gauge theories*, **JHEP 1604 (2016) 013**

48. M. Habich, G.A. Miller, P. Romatschke, W. Xiang, *Testing hydrodynamic descriptions in p+p collisions at* $\sqrt{s} = 7$ *TeV*, **Eur.Phys.J. C76 (2016) 7, 408**

49. H. Bantilan, J. Brewer, T. Ishii, W.E. Lewis, and P. Romatschke, *String Theory Based Predictions for Nonhydrodynamic Collective Modes in Strongly Interacting Fermi Gases*, **Phys.Rev. A94 (2016), 033621**

50. P. Romatschke, *Do nuclear collisions create a locally equilibrated quark-gluon plasma?*, **Eur.Phys.J. C77 (2017), 21**

51. I. Ghioiu, T. Gorda, A. Kurkela, P. Romatschke, M. Säppi, A. Vuorinen, *On high-order perturbative calculations at finite density*, **Nucl.Phys. B915 (2017) 102**

52. W. Lewis and P. Romatschke, *Higher-Order Collective Modes in a Trapped Gas from Second-Order Hydrodynamics*, **New J.Phys. 19 (2017) 023042**