

Dr. Martin Krššák

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Date of Birth: July 5, 1986
Nationality: Slovak

WORK EXPERIENCE

University of Tartu, Institute of Physics,
Postdoctoral Fellow, 11/2016–

São Paulo State University, Institute for Theoretical Physics, (IFT-UNESP),
Postdoctoral Fellow, 11/2013–10/2016

EDUCATION

Dr. rer. nat. (~PhD), Theoretical Physics, Bielefeld University, DFG International Graduate School *Quantum Fields and Strongly Interacting Matter*, Bielefeld/Paris/Helsinki, August 2013.

Dissertation: Energy Momentum Tensor Correlators in Improved Holographic QCD.

Supervisor: Aleksi Vuorinen (Bielefeld University).

Mgr. (~MSc), Theoretical Physics, Institute for Theoretical Physics, Charles University, Prague, September 2009.

Thesis: Kerr-Schild Spacetimes in Higher Dimensions.

Supervisor: Marcello Ortaggio (Institute of Mathematics, Czech Academy of Sciences, Prague).

Bc. Physics, *Honours Degree*, Comenius University, Bratislava, June 2007.

Thesis: Nonlinear Dynamics of Potential Relaxation Oscillations in Bounded Plasmas.

Supervisors: Tomáš Gyergyek (University of Ljubljana) & Jan Skalný (Comenius University).

RESEARCH INTERESTS

Mathematical foundations of gravity theories, differential geometry, teleparallel gravity, modified gravity, $f(T)$ gravity, holography, gauge/gravity dualities, conformal gravity, non-local effects in gravity.

SHORT-TERM RESEARCH/STUDY STAYS

Faculty of Physics, Saint Petersburg State University, Russia, collaboration with A. Golovnev, November 28-December 1, 2017.

School of Physics and Astronomy, Shanghai Jiao Tong University, China, collaboration with Y. Ong, October 23-27, 2017.

National Center for Theoretical Sciences, Hsinchu, Taiwan, collaboration with J. Nester and the group of C.Q. Geng, June 7-17, 2016.

Physics Department, University of Jyväskylä, Finland, collaboration with T. Koivisto, May 24-28, 2016

Helsinki Institute of Physics, collaboration with Keijo Kajantie, multiple short-term visits during 2010-2013.

Niels Bohr Institute, University of Copenhagen, 5 months, *ERASMUS*, autumn 2008.

Department of Plasma Physics, Charles University, Prague, 4 months, *CEEPUS*, spring 2007.

University of Ljubljana/Jožef Štefan Institute, Reactor Physics Department, training in plasma physics simulations (collaboration with Tomaž Gyergyek and Milan Čerček), Ljubljana, 4 months, *CEEPUS*, spring 2006.

RESEARCH GRANTS

FAPESP (São Paulo State Research Foundation) postdoctoral grant,
Project: *Holographic Principle from the Viewpoint of Teleparallel Gravity*
Total value: R\$257 000 (approx. 75 000 EUR), 2013-2016.

SCHOLARSHIPS, & AWARDS

DFG (Deutsche Forschungsgemeinschaft) PhD fellowship, 2010-2013.

Scholarship award for excellent study results, Charles University, Prague, 2007.

Scholarship award for top 5% students of faculty, Comenius university, Bratislava, 2006.

Scholarship award for top 10% students of faculty, Comenius university, Bratislava, 2005.

Special Award of Institute of Physics in Ireland for best project in physics on the 16th European Union Contest for Young Scientists, Dublin, 2004.

MEMBERSHIPS

COST action CANTATA

Lepage Research Institute Slovakia

ORGANIZATIONAL AND REFEREE WORKS

Member of the organizing committee of the conference *Geometrical Foundations of Gravity in Tartu*, August 28-September 1, 2017.

Referee for the journals: Annalen der Physik, European Physical Journal C, International Journal of Geometric Methods in Modern Physics, Chinese Journal of Physics,

TEACHING

Selected Topics in Gravity - lecturer, PhD course, University of Tartu, spring 2017.

Quantum Mechanics - tutor, MSc course, Bielefeld University, autumn 2012.

General Relativity - tutor, MSc course, Bielefeld University, spring 2011.

SEMINAR AND COLLOQUIUM TALKS

Faculty of Physics, St. Petersburg State University, Russia, November 28, 2017.

Tartu Observatory, Tartu, Estonia, November 1, 2017.

School of Physics and Astronomy, Shanghai Jiao Tong University, China, October 23, 2017.

Helsinki Institute of Physics, Helsinki, Finland, August 15, 2017.

Department of Theoretical Physics and Didactics of Physics, Comenius University, Bratislava, Slovakia, April 26, 2017.

Physics Department, University of Buenos Aires, Buenos Aires, Argentina, November 1, 2016.

National Center for Theoretical Sciences, Hsinchu, Taiwan, June 16, 2016.

Physics Department, Jyväskylä University, Jyväskylä, Finland, May 25, 2016.

Institute of Physics, University of Tartu, Tartu, Estonia, May 23, 2016.

National Technical University of Athens, Athens, Greece, May 11, 2016.

CENTRA, Multidisciplinary Center for Astrophysics, Instituto Superior Técnico, Lisbon, Portugal, May 4, 2016.

Institute of Physics, Pontifical Catholic University of Valparaiso, Valparaiso, Chile, March 24, 2016.

Department of Physics, Andrés Bello National University, Santiago, Chile, March 22, 2016.

Helsinki Institute of Physics, Helsinki, Finland, December 17, 2015.

Department of Theoretical Physics and Didactics of Physics, Comenius University, Bratislava, Slovakia, June 17, 2015.

Physics Department, University of Buenos Aires & CONICET, Buenos Aires, Argentina, March 17, 2015.

CBPF- Brazilian Center for Physics Research, Rio de Janeiro, March 4, 2015.

Institute of Mathematics, Czech Academy of Sciences, Prague, Czech Republic, January 8, 2015.

CONFERENCES AND SCHOOLS(TALK/POSTER PRESENTATION INDICATED)

The First Symposium of the BRICS Association on Gravity, Astrophysics and Cosmology (BRICS-AGAC), **talk**, Yangzhou University, China, Oct. 18-20, 2017.

Tartu-Tuorla Cosmology Meeting 2017: What Matters? **talk**, Tartu, Estonia, September 26-29, 2017.

Geometric Foundations of Gravity in Tartu, **talk/organizer**, Tartu, Estonia, August 28-September 1, 2017.

Recent Developments in Gravity, **talk**, Mykonos, Greece, September 19-22, 2016.

International Summer School on Global Analysis and Applications, **talk**, Poprad, Slovakia, August 15-19, 2016.

Santiago School on Quantum Fields and Fundamental Forces, Santiago, Chile, March 17-30, 2016.

3rd Joint Dutch-Brazil School on Theoretical Physics, São Paulo, Brazil, February 2-6, 2015.

Applied Holography Workshop, **talk**, Helsinki, Finland, March 4-8, 2013.

Barcelona Postgrad Encounters on Fundamental Physics, **talk**, Barcelona, Spain, October 17-19, 2012.

Final Colloquium 2003 – 2012, Bielefeld, Germany, September 12-14, 2012.

Frontiers in Perturbative Quantum Field Theory, Bielefeld, Germany, September 10-12, 2012.

6th School on Gravity and Field Theory, **poster**, Petropolis, Brazil, April 24-28, 2012.

ITEP Winter School, Moscow, Russia, February 14–21, 2011.

Aspects of QCD at Finite Density, Bielefeld, Germany, September 19–23, 2011.

INT Summer School on Applications of String Theory, INT Washington University, Seattle, USA, July 18–29, 2011.

Soft Opening Workshop of Bielefeld Graduate School of Theoretical Sciences, Marienfeld, Germany, February 14–15, 2011.

CERN Winter School on Supergravity, Strings, and Gauge Theory 2011, CERN, January 24–28, 2011.

Physics of Strongly Interacting Field Theories, Helsinki, Finland, October 25–29, 2010.

16th Saalburg Summer School, Wolfersdorf, Germany August 30 – September 10, 2010.

Strings and Fundamental Physics 2010, Munich, Germany, July 25 – August 6, 2010.

Parma International School of Theoretical Physics, Parma, Italy, September 8–13, 2008.

Int. Conference Nuclear Energy for New Europe 2007, **talk**, Portorož, Slovenia, September 10–13, 2007.

44th Culham Plasma Physics School, **poster**, Culham, UK, July 9-20, 2007.

Student Scientific Conference, Comenius University, **talk**, Bratislava, Slovakia, April 27, 2007.

Winter School on Symplectic Geometry, Bratislava, Slovakia, February 5–9, 2007.

London International Youth Science Forum, London, **talk**, UK, July 27 – August 10, 2005.

Launch Conference of International Year of Physics, UNESCO, Paris, France, January 13–15, 2005.

16th European Union Contest for Young Scientists, **poster**, Dublin, Ireland, September 25–29, 2004.

LANGUAGES

Slovak native (includes understanding of Czech)

English fluent

Russian advanced speaking

COMPUTER SKILLS

OS: Linux (Ubuntu & Debian)- advanced user

Programs: Mathematica, L^AT_EX- advanced user

Publication List

MARTIN KRŠŠÁK

November 2017

Unpublished/Submitted Papers

- 1 M. Hohmann, L. Järv, M. Krššák, Ch. Pfeifer, *Teleparallel theories of gravity as analogue of non-linear electrodynamics*, arXiv:1711.09930 [gr-qc], to be submitted to Phys. Rev. D.
- 2 M. Krššák, *Variational Problem and Bigravity Nature of Modified Teleparallel Theories*, arXiv:1705.01072 [gr-qc], submitted to Phys. Rev. D.

Journal Papers

- 3 S. Bahamonde, Ch. Böhmer, M. Krššák, *New classes of modified teleparallel gravity models*, Phys. Lett. B **775** (2017) 37-43, arXiv:1706.04920.
- 4 M. Krššák, *Holographic Renormalization in Teleparallel Gravity*, Eur. Phys. J. C **77** (2017) no.1, 44, arXiv:1510.06676 [gr-qc].
- 5 M. Krššák and E. N. Saridakis, *The covariant formulation of $f(T)$ gravity*, Class. Quant. Grav. **33** (2016) no.11, 115009, arXiv:1510.08432 [gr-qc].
- 6 M. Krššák and J. G. Pereira, *Spin Connection and Renormalization of Teleparallel Action*, Eur. Phys. J. C **75** (2015) 519, arXiv:1504.07683 [gr-qc].
- 7 K. Kajantie, M. Krššák, A. Vuorinen, *Energy momentum tensor correlators in hot Yang-Mills theory: holography confronts lattice and perturbation theory*, JHEP **1305** (2013) 140, arXiv:1302.1432 [hep-ph],
- 8 K. Kajantie, M. Krššák, M. Vepsäläinen and A. Vuorinen, *Frequency and wave number dependence of the shear correlator in strongly coupled hot Yang-Mills theory*, Phys. Rev. D **84**, 086004 (2011), arXiv:1104.5352 [hep-ph].

Conference Proceedings

- 9 M. Krššák, *Viscosity Correlators in Improved Holographic QCD*, Conference Proceeding of the *Barcelona Postgrad Encounters on Fundamental Physics*, arXiv:1302.3181 [hep-ph].
- 10 A. Vuorinen, M. Krššák, Y. Zhu, *Bulk and shear spectral functions in weakly and strongly coupled Yang-Mills theory*, PoS ConfinementX (2012) 191, arXiv:1301.3449 [hep-ph].
- 11 Krššák, M., Gyergyek, T., Čerček, M., Skalný, J.: *On the non-linear dynamics of potential relaxation oscillations in bounded plasmas*. In: Jenčíč, I. (ed.), Lenošek, M. (ed.). *International Conference Nuclear Energy for New Europe 2007*, Portorož, Slovenia, September 10-13. Conference proceedings. Ljubljana: Nuclear Society of Slovenia, 2007, p. 812.1-812.8.

- 12 Čerček, M., Gyergyek, T., Contulov, M., Krššák, M.: *Potential formation in the plasma with two positive ion species.* in: 13th International Congress on Plasma Physics, Kiev, May 22-26, 2006. Proceedings. Kiev: National Academy of Sciences of Ukraine, 2006, p. 1-4.