Curriculum Vitae

First name | Surname : Tajron Jurić

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Theoretical Physics Division
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Born 28 December 1987, Zagreb (Croatia)

Education

1994-1996	Elementary school (*Susedgrad*, Zagreb)
1996-2002	Elementary school (*Ksaver Šandor Đalski*, Donja Zelina)
2002-2006	High school (*Srednja škola Sesvete, opća gimnazija*, Zagreb)
2006-2011	Faculty of Science, University of Zagreb
5 May 2011	**Mag. Phys.** Master thesis: *Feynman approach to electrodynamics and gravity* advisor: dr. sc. Stjepan Meljanac
October 2011- November 2014	PhD student, University of Zagreb
26 November 2014	**Dr. Sc.** PhD thesis: *κ-Minkowski-space and Planck scale physics* advisor: dr. sc. Stjepan Meljanac

Research interests

- Theoretical and Mathematical Physics
- commutative and noncommutative Quantum Field Theory
- noncommutative spaces, generalized symmetries (Hopf algebra and Hopf algebroid), differential geometry and gauge theory
- noncommutative geometry, spectral triples, spectral action and application to particle physics
- quantum-mechanical completeness, symmetry inheritance and nonlinear fields
- mathematical structures behind Feynman integrals (period, motives) and Algebraic renormalization
- Planck scale physics, black holes and entanglement entropy
- quantum physics, Loschmidt echo, quantum termalization and integrable systems

Positions

- July 2011 - December 2014: research assistant at Theoretical Physics Division, Ruđer Bošković Institute, Zagreb, Croatia.
- January 2015 - September 2016: postdoc at Theoretical Physics Division, Ruđer Bošković Institute, Zagreb, Croatia.
- September 2016 - September 2017: postdoc at Instituto de Fisica, Universidade de Brasilia, Brasilia, DF, Brazil
- September 2017 - January 2019 : postdoc at Theoretical Physics Division, Ruđer Bošković Institute, Zagreb, Croatia.
- January 2019 - today : research associate at Theoretical Physics Division, Ruđer Bošković Institute, Zagreb, Croatia.

Teaching experience

Teaching assistant at the University of Zagreb, Department of Physics:

- Physics 1&2 (first year courses for Chemists 2011/12)
- General Physics 1&2 (first year courses for Physicists 2012/13)
- General Physics 3&4 (second year courses for Physicists 2013/14)
- Mathematical methods for physics 1&2 (second year courses for Physicists 2014/15, 2015/16, 2018/19 and 2019/20)

Scientific titles

- July 2011: Research Assistant at RBI
- December 2014: Senior Assistant/Postdoc at RBI
- April 2014: Postdoc, elected by PMF, University of Zagreb
- July 2016: Research Associate, elected by RBI

Schools, workshops and conferences

- „*Sarajevo School of High Energy Physics*“, May 2011, Sarajevo, BiH
- „*The BS2011 School – Cosmology and Particle Physics Beyond the Standard Models*“, Donji Milanovac, Srbija, August 2011
- „*Supersymmetry for toddlers ... and experimentalists*“, IRB, Zagreb, December 2011
- „*2nd Mediterranean Conference on Classical and Quantum Gravity*“, Veli Lošinj, June 2013
- Clay Mathematics Institute Summer School 2014; "*Periods and Motives: Feynman amplitudes in the 21st century*", ICMAT, Madrid (Spain) June 30 - July 25, 2014
- Summer School: "*Topics in Non-commutative Geometry*", HIM, Bonn, Germany, September 8-12, 2014
- ESI Program – "*The interrelation between mathematical physics, number theory and non-commutative geometry*", Erwin Schrödinger International Institute for Mathematical Physics, Vienna, March 2 - March 13, 2015
- Bayrischzell Workshop 2015 "*Quantization, geometry and mathematical physics*" Bayrischzell, May 29- June 1, 2015
  presented a talk entitled "*Towards the classification of differential calculi on kappa-Minkowski space and related field theories*"
- Corfu Summer Institute: " *Humboldt Kolleg Open Problems in Theoretical Physics: the Issue of Quantum Space-Time*" September 18 - 22, 2015
- Corfu Summer Institute "*Workshop on Noncommutative Field Theory and Gravity*" September 21 - 27, 2015
- Bayrischzell Workshop 2016 "*Quantum spacetime structures: Dualities and new geometries*" Bayrischzell, April 29- May 3, 2016
- XXXVII Max Born Symposium "*Noncommutative geometry, quantum symmetries and quantum gravity II* ", 4 - 7 July 2016, Wroclaw, Poland.
  presented a talk "*Noncommutative field theories on* $\mathbb{R}^3$"

- "*Quantum Structure of Spacetime and Gravity*", August 21-28, Belgrade, Serbia.
  presented a talk "*Closed star product on noncommutative* $\mathbb{R}^3$ *and scalar field dynamics*"
- "*Topological and geometrical aspects of quantum spaces field theory and causal structure*", 13 March 2017 - 17 March 2017, SISSA, Trieste, Italy
  presented a talk "*Effects of Noncommutativity on the Black Hole Entropy and QNM*"
- Bayrischzell Workshop 2018 "*On Noncommutativity and Physics: Hopf algebras in Noncommutative Geometry*" Bayrischzell, April 20 - 23, 2018
- "*Conference on Symmetries, Geometry and Quantum Gravity*" 18-22 June 2018, Primošten, Croatia
  preseted a talk "*Quantum space and quantum completeness*"
- "*Noncommutative Geometry and the Standard Model*" 8-9 November 2019, Krakow, Poland
- Master Class and Workshop (in-person meeting) "*Higher Structures Emerging from Renormalisation*" November 8 - 19. 2021, ESI Vieanna, Austria

Research visits

- French Government Grant for visiting scientific institutions in France for young researchers, December 1 - December 29, 2014,
  Laboratoire de Physique Theorique d'Orsay, Host: Prof. J.C. Wallet.
  Invited seminar: "κ-Minkowski space and Planck scale physics"
- French Government and Ruđer Bošković Institute Grant for visiting scientific institutions in France for young researchers, October 26 - November 25, 2015,
  Laboratoire de Physique Theorique d'Orsay, Host: Prof. J.C. Wallet
- February 14 - February 20, 2016: Departamento de Física Teórica, Univesity of Zaragoza, Host: Prof. Amilcar Quiroz and Filiberto Ares. Topics: quantum field theory, noncommutative geometry and entanglement entropy
- March 1 - March 30, 2016: LPT, Orsay, Paris, France, Host: Prof. J.C. Wallet, funded by RBI-T-Winning. Topics: quantum field theory, noncommutative geometry and spectral triples
- April 17-24, 2016: SISSA, Trieste, Italy. Host: Prof. L. Dabrowski. Topics: quantum field theory, noncommutative geometry and spectral triples. Funded by RBI-T-Winning
  Invited seminar "Some examples of NCQFT and NC metric"
- May 20 - June 19, 2016: LPT, Orsay, Paris, France, Host: Prof. J.C. Wallet, funded by Universite Paris-Sud and RBI-T-Winning. Topics: quantum field theory, noncommutative geometry and spectral triples
  Invited seminar "Noncommutative geometry and physics"

- March 3-26, 2017: SISSA, Trieste, Italy. Host: Prof. L. Dabrowski. Topics: quantum field theory, BTZ and spinors in spectral triple approach. Funded by RBI-T-Winning
  Invited seminar "BTZ black hole and NC contributions to entropy"
- September 9, 2016 - September 12, 2017: postdoc scholarship within Programa de Pos Doutorado funded by CAPES at IF, UnB, Brasilia, Host: Prof. A. Queiroz and Prof. A. Pinzul
- September 12 - September 26, 2017: LPT, Orsay, Paris, France, Host: Prof. J.C. Wallet, funded by RBI-T-Winning. Topics: NC quantum field theory, twisted trace and KMS condition
- March 16 - April 9, 2018: LPT, Orsay, Paris, France, Host: Prof. J.C. Wallet, funded by RBI-T-Winning. Topics: NC quantum field theory, vacuum energy and the cosmological constant problem
- November 22 - November 29, 2018: LPT, Orsay, Paris, France, Host: Prof. J.C. Wallet, funded by RBI-T-Winning. Topics: NC quantum field theory, vacuum energy and the cosmological constant problem
- December 12 - December 17, 2018: Fizički fakultet, Beograd, Srbija, Host: Prof. M.D.Ćirić, funded by RBI-T-Winning. Topics: NC scalar field on RN background

Research project and organization of workshops

- 098-0000000-2865 "Quantum field theory, noncommutative spaces and symmetries", funded by the Croatian Ministry of Science, Education and Sport, 2011-2014. Function: team member
- IP-2014-09-9582 "Toward quantum gravity: noncommutative geometry, field theory and cosmology", funded by Croatian Science Foundation, 2015-2017. Function: team member and actively participated in the preparation of the project proposal http://thphys.irb.hr/TQG.htm
- RBI-T-WINNING, funded by the European Commission under H2020, 2016-2018. Function: team member and actively participated in the preparation of the project proposal regarding math-phys http://rbi-t-winning.irb.hr/index.php?title=RBI-T-WINNING
- COST-Quantum structure of spacetime, MC-substitute
- Member of the organizing committee for the workshop "Topological and geometric aspects of quantum spaces", March 13-March 17,2017, Trieste, Italy
- Member of the organizing committee for the conference "Conference on Symmetries, Geometry and Quantum Gravity" 18-22 June 2018, Primošten, Croatia
- Head of the "Physics and Geometry seminars" at RBI http://thphys.irb.hr/phygeo/

- HRZZ projekt "Potraga za kvantnim prostorvremenom u spektru KNM za crne rupe i bljeskovima gama zraka", voditelj dr.sc. A. Samsarov, 2021-2025

Invited talks, seminars and lectures

- "*Open problems in mathematical physics*", Physics and Geometry Seminars at RBI, Zagreb, Croatia, October 17, 2019.
- "*Quantum space and quantum completeness*", talk at "*Conference on Symmetries, Geometry and Quantum Gravity*" 18-22 June 2018, Primošten, Croatia
- "*Noncommutative Geometry and Physics*", Colóquio do IF, Universidade de Brasilia, Brazil, May 11, 2017.
- "*BTZ black hole and NC contributions to entropy*", invited seminar at SISSA, Trieste, March 23, 2017.
- "*Effects of Noncommutativity on the Black Hole Entropy and QNM*", talk at workshop "*Topological and geometrical aspects of quantum spaces field theory and causal structure*", 13 March 2017 - 17 March 2017, SISSA, Trieste, Italy
- "*Closed star product on noncommutative* $\mathbb{R}^3$ *and scalar field dynamics*", talk at school "*Quantum Structure of Spacetime and Gravity*", August 21-28, 2016, Belgrade, Serbia.
- "*Noncommutative field theories on* $\mathbb{R}^3$", talk at the XXXVII Max Born Symposium "*Noncommutative geometry, quantum symmetries and quantum gravity II* ", 4 - 7 July 2016, Wroclaw, Poland.
- "*Noncommutative geometry and physics*", invited lecture by SInJe, LPT-Orsay, France, June 14, 2016.
- "*Some examples of NCQFT and NC metric*", invited seminar at SISSA, Trieste, April 19, 2016.
- "*Towards the classification of differential calculi on kappa-Minkowski space and related field theories*", talk at workshop "*Quantization, geometry and mathematical physics*" Bayrischzell, May 29- June 1, 2015
- "κ*-Minkowski space and Planck scale physics*", invited seminar at LPT-Orsay, France, December 17, 2014.
- "κ*-Poincare algebra and Hopf algebroid structure of phase space*", Theoretical Physics Seminar at RBI, Zagreb, Croatia, September 9, 2014.
- "*Paradoxes in QM and selfadjoint extension*", Journal Club Seminar at RBI, Zagreb, Croatia, October 26, 2012.

List of publications

1. E. Harikumar, **T. Jurić** and S. Meljanac, "*Electrodynamics on κ-Minkowski space-time*," **Phys. Rev. D 84**, 085020 (2011) [arXiv:1107.3936 [hep-th]].

2. E. Harikumar, **T. Jurić** and S. Meljanac, "*Geodesic equation in κ-Minkowski spacetime*," **Phys. Rev. D 86** (2012) 045002 [arXiv:1203.1564 [hep-th]].

3. **T. Jurić**, S. Meljanac and R. Štrajn, "*Differential forms and κ-Minkowski spacetime from extended twist*," **Eur. Phys. J. C 73** (2013) 2472 [arXiv:1211.6612 [hep-th]].

4. **T. Jurić**, S. Meljanac and R. Strajn, "*κ-Poincaré-Hopf algebra and Hopf algebroid structure of phase space from twist*," **Phys. Lett. A 377** (2013) 2472 [arXiv:1303.0994 [hep-th]].

5. **T. Jurić**, S. Meljanac and R. Strajn, "*Twists, realizations and Hopf algebroid structure of kappa-deformed phase space*," **Int. J. Mod. Phys. A 29** (2014) 5, 1450022 [arXiv:1305.3088 [hep-th]].

6. **T. Jurić**, S. Meljanac and R. Strajn, "*Universal κ-Poincaré covariant differential calculus over κ-Minkowski space*," **Int. J. Mod. Phys. A 29** (2014) 1450121 [arXiv:1312.2751 [hep-th]].

7. K. S. Gupta, E. Harikumar, **T. Juric**, S. Meljanac and A. Samsarov, "*Effects of Noncommutativity on the Black Hole Entropy*," **Adv. High Energy Phys**. Vol. 2014 (2014), Article ID 139172, arXiv:1312.5100 [hep-th]

8. **T. Juric**, D. Kovacevic and S. Meljanac, "*κ-Deformed Phase Space, Hopf Algebroid and Twisting*," **SIGMA 10**, 106 (2014), [arXiv:1402.0397 [math-ph]].

9. **T. Jurić**, S. Meljanac, D. Pikutić and R. Štrajn, "*Toward the classification of differential calculi on κ-Minkowski space and related field theories*," **JHEP 1507**, 055 (2015), [arXiv:1502.02972 [hep-th]].

10. K. S. Gupta, E. Harikumar, **T. Jurić**, S. Meljanac and A. Samsarov, "*Noncommutative scalar quasinormal modes and quantization of entropy of a BTZ black hole*," **JHEP 1509**, 025 (2015), [arXiv:1505.04068 [hep-th]].

11. **T. Jurić**, S. Meljanac and A. Samsarov, "*Light-like κ-deformations and scalar field theory via Drinfeld twist*," **J. Phys. Conf. Ser. 634**, no. 1, 012005 (2015), [arXiv:1506.02475 [hep-th]].

12. **T. Juric**, S. Meljanac and D. Pikutic, "*Realizations of κ-Minkowski space, Drinfeld twists and related symmetry algebras*," **Eur. Phys. J. C 75**, no. 11, 528 (2015), [arXiv:1506.04955 [hep-th]].

13. A. Géré, **T. Jurić** and J. C. Wallet, "*Noncommutative gauge theories on $\mathbb{R}^3_\lambda$: Perturbatively finite models*," **JHEP** 12 (2015) 045, arXiv:1507.08086 [hep-th].

14. **T. Jurić**, S. Meljanac and A. Samsarov, "*Twist deformations leading to κ-Poincaré Hopf algebra and their application to physics*," **J. Phys. Conf. Ser. 670** (2016) 1, 012027 [arXiv:1511.05592 [hep-th]].

15. **T. Jurić** and A. Samsarov, "*Entanglement Entropy Renormalization for the NC scalar field coupled to classical BTZ geometry*," **Phys. Rev. D 93**, no. 10, 104033 (2016), arXiv:1602.01488 [hep-th].

16. A. Borowiec, **T. Juric**, S. Meljanac and A. Pachol, "*Noncommutative tetrads and quantum spacetimes*," Int. J. Geom. Meth. Mod. Phys. **13** (2016) no.08, 1640005 arXiv:1602.01292 [hep-th].

17. **T. Jurić**, T. Poulain and J. C. Wallet, "*Closed star product on non-commutative* $\mathbb{R}^3$ *and scalar field dynamics*," **JHEP 1605**, 146 (2016) arXiv:1603.09122 [hep-th].

18. **T. Jurić**, T. Poulain and J. C. Wallet, "*Involutive representations of coordinate algebras and quantum spaces*," **JHEP 1707** (2017) 116, arXiv:1702.06348 [hep-th].

19. K. S. Gupta, **T. Jurić** and A. Samsarov, "*Noncommutative duality and fermionic quasinormal modes of the BTZ black hole*," **JHEP 1706** (2017) 107, arXiv:1703.00514 [hep-th].

20. **T. Jurić**, "Quantum space and quantum completeness," JHEP **1805** (2018) 007, arXiv:1802.09873 [hep-th].

21. **T. Jurić**, T. Poulain and J. C. Wallet, "Vacuum energy and the cosmological constant problem in κ-Poincaré invariant field theories," Phys. Rev. D **99** (2019) no.4, 045004, arXiv:1805.09027 [hep-th].

22. K. S. Gupta, **T. Jurić**, A. Samsarov and I. Smolić, "Noncommutativity and the Weak Cosmic Censorship," JHEP **1910** (2019) 170, arXiv:1908.07402 [hep-th]

23. A. Bokulić, T. Jurić and I. Smolić, "Black hole thermodynamics in the presence of nonlinear electromagnetic fields," Phys. Rev. D **103** (2021) no.12, 124059, arXiv:2102.06213 [gr-qc].

24. T. Jurić, "Observables in Quantum Mechanics and the importance of self-adjointness," [arXiv:2103.01080 [quant-ph]].

25. T. Jurić and H. Nikolić, "Arrival time from the general theory of quantum time distributions," [arXiv:2107.08777 [quant-ph]].

26. A. Bokulić, T. Jurić and I. Smolić, "Nonlinear electromagnetic fields in strictly stationary spacetimes," [arXiv:2111.10387 [gr-qc]].

Track record (according to INSPIRE, December 2021)

26 scientific papers with total 448 citations and h-index 14.

Languages

Croatian (native speaker), English (very good command), Portuguese (good command), German (basic communication skills)

Menthorships

- 2021 voditelj diplomskog rada "Hopfove algebre u fizici," student Nikola Herceg
- 2020/21 mentor Istraživačkog seminara (peta godina Istraživačkog studija fizike na PMF-u): "Particle statistics", student Nikola Herceg
- 2019/20 mentor Istraživačkog seminara (peta godina Istraživačkog studija fizike na PMF-u): "Noncommutative Geometry", student Jamal Hammoud
- 2019/20 mentor Istraživačkog seminara (peta godina Istraživačkog studija fizike na PMF-u): "Quantum completeness", student Karlo Delić

Awards and scholarships

- Stipedija Grada Zagreba za školsku godinu 2004/05 i 2005/06
- Stipendija Hrvatskog Olimpijskog odbora za vrhunske sportaše (III. kategorija) 2008. i 2009.
- Stipendija Nacionalne zaklade za potporu učeničkom i studentskom standardu 2010/11.
- Stipendija Veleposlanstva Republike Francuske za sufinanciranje kratkoročnog posjeta znanstvenim institucijama Republike Francuske 2014.
- Stipendija Veleposlanstva Republike Francuske i IRB-a za sufinanciranje kratkoročnog posjeta znanstvenim institucijama Republike Francuske 2015.
- Godišnja nagrada IRB-a za izvrstan znanstveni rad u 2013.
- Godišnja nagrada IRB-a za izvrstan znanstveni rad u 2018.
- Poslijedoktorska stipendija "Programa de Pos Doutorados", CAPES, IF, UnB, Brasilia, 2016