

Juraj Tekel

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Affiliation

- 2026 to present **Docent**, *Department of theoretical physics, Faculty of mathematics, physics and informatics, Comenius University, Bratislava, Slovakia*
associate professor equivalent
- 2013 to 2025 **Odborný asistent**, *Department of theoretical physics, Faculty of mathematics, physics and informatics, Comenius University, Bratislava, Slovakia*
assistant professor equivalent

Education

- 2009 to 2013 **Ph.D.**, *The Graduate center, The City University of New York, New York, USA*
- 2003 to 2008 **Master**, *Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovakia*
specialization - mathematical and theoretical physics
degree received - *magister, Mgr.*

Research Experience

- 2026 to present **Principal investigator**, Quantum structures of spacetime, VEGA-1/0604/26 grant
- 2023 to 2026 **Member of the research team**, Matrix models and quantum gravity, VEGA-1/0025/23 grant
- 2022 to 2026 **Secondary proposer, core group member, WG5 leader, MC member**, Cartan geometry, Lie, Integrable Systems, quantum group Theories for Applications (CaLISTA), CA21109 action, COST (European Cooperation in Science and Technology)
- 2022 **VKSIIa**, awarded by Slovak Academy of Sciences
- 2020 to 2023 **Principal investigator**, Quantum structure of spacetime, VEGA-1/0703/20 grant
- 2016 to 2019 **Member of the research team**, Towards the unification of quantum field theory and gravity in the new physics, VEGA-1/0985/16 grant
- 2015 to 2019 **Project member**, Quantum structure of spacetime (QSPACE), MP1405 action, COST (European Cooperation in Science and Technology)
- Visiting scientist **Faculty of physics and Faculty of pharmacy, University of Belgrade**
Jun 2025, Jun 2026
- Visiting scientist **Faculty of physics, University of Belgrade**
Jun 2024

Visiting scientist *Faculty of physics, University of Vienna*
April 2016, November 2021

Visiting scientist *School of Theoretical Physics, DIAS, Dublin*
November 2015, June 2016, June 2018

Visiting scientist *Erwin Schrödinger International Institute of Theoretical Physics, Vienna*
March 2015, November 2015, July 2018, September 2023

PhD thesis project *Fuzzy field theory as Random Matrix Model*
Research mentor : prof. V.P. Nair

Publications

- B. Bukor, D. Prekrat, J. Tekel, *Pinpointing Triple Point of Non-commutative Matrix Model with Curvature*, J.Phys.A 59 (2026) 5, 055401
- M. Hrmo, P. Rusnak, S. Kováčik, J. Tekel, *Hydrogen Atom in a Fuzzy Spherical Cavity*, Phys.Rev.D 113 (2026) 10, 106026
- B. Bukor, J. Tekel, *Cubic asymmetric multitrace matrix model*, J. Phys. A: Math. Theor. 58 (2025) 255203
- S. Kováčik, J. Tekel, *Fuzzy onionlike space as a matrix model*, Phys.Rev.D 109 (2024) 10, 105004
- D. Prekrat, D. Ranković, N. K. Todorović-Vasović, S. Kováčik, J. Tekel, *Phase transitions in a Φ^4 matrix model on a curved noncommutative space*, International Journal of Modern Physics A, Vol. 38, No. 32, 2343002 (2023).
- S. Kováčik, J. Tekel, *The Fuzzy Onion: A Proposal*, PoS CORFU2022 (2023) 312
- J. Tekel, M. Šubjaková, D. Prekrat, D. Ranković, N. K. Todorović-Vasović, S. Kováčik, *Towards removal of striped phase in matrix model description of fuzzy field theories*, PoS CORFU2022 (2023) 310.
- J. Tekel, *Fuzzy scalar field theories*, Eur. Phys. J. Spec. Top. 232, 3625–3636 (2023).
- B. Bukor, J. Tekel, *On quarkonium masses in 3D non-commutative space*, Eur. Phys. J. Plus **138**, 499 (2023).
- D. Prekrat, D. Ranković, N. K. Todorović-Vasović, S. Kováčik, J. Tekel, *Approximate treatment of noncommutative curvature in quartic matrix model*, JHEP **01** (2023) 109
- H. Steinacker, J. Tekel, *Fuzzy field theories in the string modes formalism*, PoS CORFU2021 (2022) 244
- H. Steinacker, J. Tekel, *String modes, propagators and loops on fuzzy spaces*, JHEP **06** (2022) 136.
- S. Kováčik, J. Tekel, *Eigenvalue-flipping algorithm for matrix Monte Carlo*, JHEP **04** (2022) 149.
- M. Šubjaková, J. Tekel, *Beyond second-moment approximation in fuzzy-field-theory-like matrix models*, JHEP **02** (2022) 065.
- M. Šubjaková, J. Tekel, *Fuzzy field theories and related matrix models*, PoS CORFU2019 (2020) 189.

M. Šubjaková, J. Tekel, *Multitrace matrix models of fuzzy field theories*, PoS CORFU2019 (2020) 234

M. Šubjaková, J. Tekel, *Second moment fuzzy-field-theory-like matrix models*, JHEP 2020, 88 (2020).

M. Šubjaková, J. Tekel, *Matrix Models of Fuzzy Field Theories*, PoS CORFU2017 (2018) 144.

J. Tekel, *Asymmetric hermitian matrix models and fuzzy field theory*, Phys.Rev. D97 (2018) no.12, 125018.

J. Tekel, *Phase diagram of scalar field theory on fuzzy sphere and multitrace matrix models*, PoS(CORFU2015)123.

J. Tekel, *Phase Structure of Fuzzy Field Theories and Multitrace Matrix Models*, Acta Physica Slovaca 65, No.5, 369-468 (2015).

J. Tekel, *Matrix model approximations of fuzzy scalar field theories and their phase diagrams*, JHEP **12** (2015) 176.

J. Tekel, *Uniform order phase and phase diagram of scalar field theory on fuzzy CP_n*, JHEP **10** (2014) 144.

D. Capasso, V.P. Nair and J. Tekel, *The Isospin Asymmetry in Anomalous Fluid Dynamics*, Phys. Rev. D **88**, 085025 (2013)

J. Tekel, *Fuzzy field theory as Random matrix model*, doctoral thesis, GC CUNY (2013)

J. Tekel, *Random matrix approach to scalar fields on fuzzy spaces*, Phys. Rev. D **87**, 085015 (2013)

V.P. Nair, A.P. Polychronakos and J. Tekel, *Fuzzy spaces and new random matrix ensembles*, Phys. Rev. D **85**, 045021 (2012)

J. Tekel and L. Cohen, Proc. ECUA 2012 (34), Vol. 1 331 (2012); Proc. SPIE Vol. 8391, 83910E (2012); Proc. SPIE Vol. 7335, 733505 (2009)

Other experience

Invited talks

- Jun 2025 **Matrix ensembles from fuzzy physic**
University of Belgrade
- April 2026 **How to give a talk**
CaLISTA Training School, Valencia
- September 2025 **Matrix ensembles from fuzzy physics**
Corfu Summer Institute '25
- Jun 2025 **Matrix ensembles from fuzzy physics**
STP, DIAS, Dublin
- Jun 2025 **Fuzzy onion strikes back**
University of Belgrade
- Jun 2024 **Fuzzy Physics and Matrix Models**
University of Belgrade
- May 2024 **Connection unexpected – a case study in science outreach**
Calista Annual Meeting, Sofia

- September 2023 **Correlation functions in fuzzy scalar field theories**
Corfu Summer Institute '23
- August 2023 **Towards removal of striped phase in matrix model description of fuzzy field theories**
Gravity, Noncommutative Geometry, Cosmology, CMO Workshop, Oaxaca
- April 2023 **Why and how to talk about science to general public**
Calista KickOff meeting, Bologna
- September 2022 **Towards removal of striped phase in matrix model description of fuzzy field theories**
Corfu Summer Institute '22
- August 2022 **A less commutative view of Standard model**
NA62 collaboration meeting, Bratislava
- March 2022 **String modes and fuzzy field theories in string modes formalism**
University of Vienna
- September 2021 **Fuzzy field theories in the string modes formalism**
Corfu Summer Institute '21
- September 2019 **Fuzzy field theory and related matrix models**
Corfu Summer Institute '19
- January 2018 **Matrix models of fuzzy field theories**
TU Vienna
- November 2015 **Phase structure of fuzzy field theory and multitrace matrix models**
STP, DIAS, Dublin

Teaching Experience

- 2013 to present lecturer and author of the lecture notes for *Foundations of Physics* undergraduate course at FMFI UK
- lecturer and author of the lecture notes for *Differential equations* graduate course at FMFI UK
- array of teaching positions for undergraduate and graduate level physics courses at FMFI UK
- 2009 to 2013 array of teaching assistant positions for graduate and undergraduate level physics courses at CCNY and GF CUNY
- with V.P. Nair co-author of the lecture notes for the course *Algebraically solvable problems in physics* regularly given at GC CUNY

Theses supervised

- Bachelor Erik Benovič (2018), Štefan Hnát (2018), Simon Mičky (2020), Daniel Račko (2021), Benedek Bukor (2022), Adam Kubiš (2025)
- Master Mária Šubjaková (2017), Benedek Bukor (2024), Adam Kubiš (expected graduation 2027)
- Doctoral Mária Šubjaková – consultant (2022)

Science outreach

- 2023 One of the authors of the book *On enlightened prime minister, Christmas carp and Slovak Greta*, in Slovak.
- 2021 Author of the book *Physics in blind alleys*, in Slovak, available online.

- 2020 to present Author of articles in Slovak popular-science magazine Quark.
- 2019 Author of the series *How do we know?* in Slovak popular-science magazine Quark.
- 2019 to present board member of the NGO *Vedator*
- 2018 to present Organizer of public events *Vedatour* for general public, including event at the largest festival in Slovakia (attended by more than 6000 people).
- 2015 to present Author and host of YouTube series *Connection unexpected*, with more than 60000 views (in Slovak).
- 2013 to present Presenter of a large number of science outreach presentations aimed at general public and high-school students, recordings often available on YouTube.
- 2008 to present Author of a large number of freely available texts and study materials on undergraduate and high-school physics (in Slovak).

Links for scientific databases

ORCID, 0000-0001-6573-0547

Scopus, 55912820800

Web of Science, GDS-4303-2022