

Juraj Tekel

KTF, FMFI UK, Mlynska Dolina

842 48 Bratislava, Slovakia

📞 +421-2-60295-653

✉ juraj.tekel@fmph.uniba.sk

🌐 davinci.fmph.uniba.sk/~tekel1

Affiliation

2026 to **Docent**, *Department of theoretical physics, Faculty of mathematics, physics and informatics, Comenius University, Bratislava, Slovakia*
present associate professor equivalent

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

Education

2009 to **Ph.D.**, *The Graduate center, The City University of New York, New York, USA*
2013

2003 to **Master**, *Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, Slovakia*
2008 specialization - mathematical and theoretical physics
degree received - *magister, Mgr.*

Research Experience

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

Visiting scientist **Faculty of physics, University of Belgrade**
Jun 2024

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

Visiting scientist	<i>School of Theoretical Physics, DIAS, Dublin</i> November 2015, June 2016, June 2018
Visiting scientist	<i>Erwin Schrödinger International Institute of Theoretical Physics, Vienna</i> March 2015, November 2015, July 2018, September 2023
PhD thesis project	<i>Fuzzy field theory as Random Matrix Model</i> Research mentor : prof. V.P. Nair

Publications

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

September 2025 **Matrix ensembles from fuzzy physics: the good, the bad, the ugly**
Corfu Summer Institute '25

Jun 2025 **Matrix ensembles from fuzzy physics: the good, the bad, the ugly**
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 (expected graduation 2025)

Master Mária Šubjaková (2017), Benedek Bukor (2024)

Doctoral Mária Šubjaková – consultant (2022), Benedek Bukor (expected graduation 2028)

Science outreach

2019 Author of the series *How do we know?* in Slovak popular-science magazine Quark.

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 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 Author and host of YouTube series *Connection unexpected*, with more than 60000 views (in Slovak).

2013 to Presenter of a large number of science outreach presentations aimed at general public and high-school students, recordings often available on YouTube.

2008 to 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