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Juraj Tekel

Affiliation

2013 to present — **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

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, 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

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 CPn*, 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 2024 — **Fuzzy Physics and Matrix Modelss**
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

Januray 2018 — **Matrix models of fuzzy field theories**
TU Vienna

November 2015 — **Phase structure of fuzzy field theory and multritrace 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

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 *Ved ator*

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