

SAMUEL KOVÁČIK, PhD
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ORCID 0000-0002-7643-1363

Born 15/10/1988 in Bratislava, Slovakia

PROFESSIONAL EXPERIENCE

Comenius University in Bratislava, 2020 – present

Associate professor, theoretical physics

Masaryk University in Brno, 2020 – present

Researcher, science outreach

VKS IIa qualification grade 2022

Awarded by Slovak Academy of Sciences

Dublin Institute for Advanced Studies Fellowship, 2019 – 2020

Topics: Matrix models, Gauge theories, Gauge/Gravity duality

Title: *Matrix models in M-theory*

Supervisor: Prof Denjoe O' Connor

Government of Ireland Postdoctoral Fellowship, 2017 – 2019

Topics: Matrix models, numerical simulations, quantum physics

Title: *Quantization of Membranes and Testing Gauge/Gravity Duality*

Supervisor: Prof Denjoe O' Connor

Dublin Institute for Advanced Studies Fellowship, 2016 – 2017

Topics: Matrix models, numerical simulations

Title: *Matrix models in M-theory*

Supervisor: Prof Denjoe O' Connor

EDUCATION

PhD, Theoretical Physics and Mathematical Physics, Comenius University in Bratislava, 2016

Topics: Noncommutative space, quantum mechanics

Dissertation: *Aspects of physics in noncommutative space*

Dissertation supervisor: Prof Peter Prešnajder

Mgr (MSc equivalent), Theoretical Physics, Comenius University in Bratislava, 2012

Topics: Noncommutative space, quantum mechanics

Thesis: *The velocity operator in quantum mechanics with noncommutative geometry*

Thesis supervisor: Prof Peter Prešnajder

BSc, Physics, Comenius University in Bratislava, 2010

Topics: Numerical solutions, rigid body physics

Thesis: *When does motorbike front wheel lift?*

Thesis supervisor: Dr. Martin Mojžiš

PRIZES, AWARDS and FUNDING

VEGA funding, 2023-2026

Principal investigator, 4 years, project title: *Matrix models and quantum gravity*

VEGA funding, 2020-2023

Team member, 4 years, project title: *Quantum structure of spacetime*

COST action RouteQFT: *Quantum field theory under external conditions: from topological materials to the early Universe*

Project member, *proposal under review*

COST action *Cartan geometry, Lie, Integrable Systems, quantum group Theories for Applications (CaLISTA)*

Project member, *CA21109 action, European Cooperation in Science and Technology, 2022-2026*

COST action *Quantum structure of spacetime (QSPACE)*

Project member, *MP1405 action, European Cooperation in Science and Technology, 2015-2019*

Government of Ireland Postdoctoral Fellowship

Funding for postdoctoral position, 2 years, project title: *Quantization of Membranes and Testing Gauge/Gravity Duality*

ESET Foundation (Original in Slovak: Nadácia ESET), **three times**

Funding to organize a series of scientific public events (*Vedatour*)

VÁCLAV VOTRUBA prize (honourable mention)

for the best dissertation in mathematical physics, awarded by Doppler Institute for Mathematical Physics in Prague

YOUNG SCIENTIST funding (500 € yearly during PhD studies)

Comenius University in Bratislava (Faculty of Mathematics, Physics and Informatics) student award

SUPERVISING, TEACHING AND MENTORING

Lecturer and author of lecture notes

Theoretical physics for students of pedagogics (graduate level, Comenius University in Bratislava, electronic notes finished)

Lecturer

Selected topics in statistical physics (graduate level, Comenius University in Bratislava, electronic notes in progress)

Thesis supervisor for students on different aspects of quantum space (four master thesis, four bachelor thesis, four students in preparation) since 2020

Mentor in DASATO

Mentoring high-school students with interest in physics, since 2022

Assistant thesis supervisor for prof. Peter Prešnajder during PhD studies, 2013 – 2016

Cascades project supervisor for 2011 season

Physics competition for high-school students organized by International Particle Physics Outreach Group

SCIENCE OUTREACH

Founded project *Vedátor* (*Scientist* in English) on 27/11/2016

Multiplatform science-communication project with weekly a reach of approximately 100 000 people, organizing monthly public events (often also contributing a talk), co-organized scientific content for *Pohoda festival 2019* (jointly with CERN and Comenius University), gave approximately hundred public/school talks including two TEDx talks. Hosts a popular Vedátorský (scientific) podcast and YouTube show *Rozhovory o vesmíre* (Discussions about the cosmos). Published four science outreach books (*Najznámejšie experimenty vo fyzike*, *Obyčajné zázraky*, *Kúsky reality*, *Rozhovory o vesmíre*).

CONFERENCE ORGANIZATION

QSPACE in Bratislava, 11/2/2019–15/2/2019

Member of the local organizing committee, a conference organized as the final event of the COST Action MP1405 “*Quantum Structure of Spacetime QSPACE*”

Balfest in Dublin, 22/1/2018–26/1/2018

Member of the local organizing committee, a conference organized for the celebration of the scientific career of A. P. Balachandran

Contributed talks

Attended 20+ conferences and workshops with contributed talks about various aspects of physics of quantum space and matrix models

OTHER SKILLS

Programming

Experienced with Mathematica, C++, Fortran90, Python and various typing/graphical software

Science communication

Proficient in writing, confident public speaker (at all levels of audience expertise), experienced with science outreach tools (graphical/video software, science pages at social networks)

Languages

Fluent in English, Czech, Slovak

Predmet	Rozsah	Semeter	Stupeň	Počet odučených rokov
Vybrané kapitoly zo štatistickej fyziky	4h prednášky	Letný	Magisterský	4
Teoretická fyzika	2h prednášky 2h cvičenia	Zimný	Magisterský	4
Vybrané kapitoly z modernej fyziky	2h prednášky 1h cvičenia	Letný	Magisterský	4

Vybrané kapitoly zo štatistickej fyziky (magisterský stupeň)

Pokročilé techniky teórie pravdepodobnosti, elementy matematickej štatistiky a testovanie hypotéz, elementy teórie informácie a optimálneho kódovania, entropia a jej súvis s teóriou informácie, matica hustoty, Bogoljubovova nerovnosť a variačné techniky, súvis klasickej a kvantovej štatistiky, Metropolisov algoritmus, súvis termodynamiky a štatistickej fyziky, Van der Waalsov plyn, Fluctuation-response teorém, Fluctuation-dissipation teorém, spin-spinová interakcia, Isingov model, teória stredného poľa, Landauova teória fázových prechodov, transfer matica, Isingov model na štvorcovej mriežke: exaktný výpočet teplopty fázového prechodu, Boltzmannova kinetická rovnica, transportné javy v priblížení relaxačného času, rovnice hydrodynamiky ako dôsledok Boltzmannovej rovnice, Langevinova rovnica

Teoretická fyzika (magisterský stupeň)

Klasická mechanika, fyzika vln, komplexné čísla, oscilácie, fyzika tečenia, termodynamika, relativistická fyzika.

Vybrané kapitoly z modernej fyziky (magisterský stupeň)

Štatistická fyzika, termodynamika, pohľady teoretickej fyziky na svetlo, elektrinu, elektromagnetizmus, jadrovú fyziku, kvantovú mechaniku, časticovú fyziku a kozmológiu.

PUBLICATIONS

Fuzzy onionlike space as a matrix model S Kováčik, J Tekel Physical Review D 109 (10), 105004, 2024.

Expanding Microscopic Black Holes S Kováčik International Journal of Modern Physics D, 2024.

Phenomenology of the dispersion law in three-dimensional quantum space - S Kováčik, M Ďurišková, P Rusnák, arXiv preprint arXiv:2402.05832, 2024, under review.

Phase transitions in a matrix model on a curved noncommutative space - D Prekrat, D Ranković, NK Todorović-Vasović, S Kováčik, J Tekel, IJMPA 38, 2023.

The Fuzzy Onion: A proposal - S Kováčik, J Tekel, arXiv preprint arXiv:2304.14205, 2023.

Towards removal of striped phase in matrix model description of fuzzy field theories - J Tekel, M Šubjaková, D Prekrat, D Ranković, KN Todorović-Vasović, Proceedings of Science 436, 2023.

Approximate treatment of noncommutative curvature in quartic matrix model - D Prekrat, D Ranković, NK Todorović-Vasović, S Kováčik, J Tekel, Journal of High Energy Physics 2023 (1), 1-33, 2023; total citations 3.

Eigenvalue-flipping algorithm for matrix Monte Carlo - S Kováčik, J Tekel, Journal of High Energy Physics 2022 (4), 1-12, 2022; total citations 3.

Microscopic black holes as probes for quantum gravity - S Kováčik, arXiv preprint arXiv:2203.12332, 2022; total citations 1.

Hawking-radiation recoil of microscopic black holes - S Kováčik, Physics of the Dark Universe 34, 100906, 2021; total citations 13.

The confining transition in the bosonic BMN matrix model - Y Asano, S Kováčik, D O'Connor, Journal of High Energy Physics 2020 (6), 1-17, 2020; total citations 8.

The nonperturbative phase diagram of the bosonic BMN matrix model - S Kováčik, D O'Connor, Y Asano, arXiv preprint arXiv:2004.05820, 2020; total citations 8.

Triple point of a scalar field theory on a fuzzy sphere - S Kováčik, D O'Connor, Journal of High Energy Physics 2018 (10), 1-13, 2018; total citations 14.

Alternative description of magnetic monopoles in quantum mechanics - S Kováčik, P Prešnajder, The European Physical Journal C 78, 1-4, 2018; total citations 4.

Magnetic monopoles in noncommutative quantum mechanics 2 - S Kováčik, P Presnajder, J. Math. Phys 59, 082107, 2018; total citations 4.

The non-perturbative phase diagram of the BMN matrix model - Y Asano, VG Filev, S Kováčik, D O'Connor, Journal of High Energy Physics 2018 (7), 1-16, 2018; total citations 27.

A computer test of holographic flavour dynamics. Part II - Y Asano, VG Filev, S Kováčik, D O'Connor, Journal of High Energy Physics 2018 (3), 1-11, 2018; total citations 16.

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Magnetic monopoles and symmetries in noncommutative space - S Kováčik, P Prešnajder, Journal of Physics: Conference Series 965 (1), 012024, 2018; total citations 3.

R^3_λ -inspired black holes - S Kováčik, Modern Physics Letters A 32 (25), 1750130, 2017; total citations 8.

Precision Test of Holographic Flavourdynamics - Y Asano, VG Filev, S Kováčik, D O'Connor, Quantum Theory And Symmetries, 173-179, 2017.

The flavoured BFSS model at high temperature - Y Asano, VG Filev, S Kováčik, D O'Connor, Journal of High Energy Physics 2017 (1), 1-32, 2017; total citations 15.

NC plane waves, Casimir effect and flux tube potential with Lüscher terms - S Kováčik, P Prešnajder, arXiv preprint arXiv:1603.00292, 2016; total citations 5.

Quantum mechanics in noncommutative space - V Gáliková, S Kováčik, P Prešnajder, Acta Phys.Slov. 65 3, 153-234, 2015.

LAPLACE-RUNGE-LENZ VECTOR IN QUANTUM MECHANICS IN NONCOMMUTATIVE SPACE - P Prešnajder, V Gáliková, S Kováčik, Acta Polytechnica 54 (2), 149-155, 2014; total citations 1.

Laplace-Runge-Lenz vector in quantum mechanics in noncommutative space - V Gáliková, S Kováčik, P Prešnajder, Journal of Mathematical Physics 54 (12), 2013; total citations 30.

The velocity operator in quantum mechanics in noncommutative space - S Kováčik, P Prešnajder, Journal of Mathematical Physics 54 (10), 2013; total citations 22.

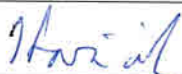
VYHLÁSENIE UCHÁDZAČA

Uchádzač zaslaním prihlášky do tohto výberového konania berie na vedomie, že v zmysle Nariadenia Európskeho parlamentu a Rady (EÚ) 2016/679 z 27. apríla 2016 o ochrane fyzických osôb pri spracúvaní osobných údajov a o voľnom pohybe takýchto údajov (ďalej len „Nariadenie GDPR“) je poskytnutie osobných údajov účastníka výberového konania a následné spracovanie osobných údajov účastníka prevádzkovateľom Univerzita Komenského v Bratislave, IČO: 00 397 865 vykonávané na právnom základe čl. 6 ods. 1. písmeno b) Nariadenia GDPR.

Uchádzač tohto výberového konania zároveň prehlasuje týmto písomným prehlásením, že sa oboznámil s dostupnými informáciami prevádzkovateľa Univerzita Komenského v Bratislave, IČO: 00 397 865 o spracúvaní osobných údajov prevádzkovateľom v rozsahu stanovenom právnymi predpismi upravujúcimi oblasť ochrany osobných údajov v podmienkach Univerzity Komenského v Bratislave a to na <https://uniba.sk/ochrana-osobnych-udajov/> a s prehlásením prevádzkovateľa, že pri spracúvaní jeho osobných údajov v žiadnom prípade nebude dochádzať k cezhraničnému prenosu.

Uchádzač svojím podpisom **UDEĽUJE / NEUDEĽUJE*** súhlas s uverejnením svojich údajov v rozsahu podľa § 76 ods. 10 písm. a) zákona č. 131/2002 Z. z. vysokých školách a o zmene a doplnení niektorých zákonov.

Uchádzač svojím podpisom zároveň potvrdzuje, že v prípade uvedenia osobných údajov tretej osoby zabezpečil tejto osobe poskytnutie informácií o podmienkach spracúvania osobných údajov na Univerzite Komenského v Bratislave, Fakulte matematiky, fyziky a informatiky a že bol oprávnený poskytnúť Univerzite Komenského v Bratislave, Fakulte matematiky, fyziky a informatiky osobné údaje tejto osoby.

Meno, priezvisko, titul uchádzača:	Mgr. Samuel Kováčik, PhD
Dátum:	22. 5. 2024
Podpis uchádzača:	

* *nehodiace sa preškrtnite*

