

Hrvoje Buljan

Osobni podatci

Datum i mjesto rođenja: 17. 10. 1972. u Zagrebu, Hrvatska.

Narodnost i državljanstvo: Hrvat, Republika Hrvatska

Obrazovanje

- **Doktorat znanosti.** Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Hrvatska. Izrada doktorske disertacije iz polja fizike; obrana disertacije 2002. godine
Naslov doktorske disertacije: “*Topološka obilježja i mjere kaotičnih mapa sa suženim područjem definicije i njihova primjena*”;
Mentor doktorske disertacije: Prof. dr. sc. V. Paar
- Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu, Hrvatska, dodiplomsko obrazovanje, smjer: diplomirani inženjer fizike;
Diplomski rad: “*Primjena baze sa srednjicom u modelu međudjelujućih bozona i fermiona*”; obrana diplomskog rada 1997. godine
Mentor diplomskog rada: Prof. dr. sc. V. Paar
- Srednja škola:
Četvrti razred (1990/1991): South Lyon High, South Lyon, Michigan, USA
Prvi-treći razred (1987-1990): MIOC, Zagreb, Hrvatska
- Osnovna škola: OŠ „Vrbovec“, Vrbovec, Hrvatska

Podatci o zaposlenjima i zvanjima

- **Redoviti profesor u trajnom zvanju** na Fizičkom odsjeku Prirodoslovno-matematičkog fakulteta u Zagrebu, (1.4.2019 -)
- **Redoviti profesor** na Fizičkom odsjeku Prirodoslovno-matematičkog fakulteta u Zagrebu, (2013-2019)
- **Izvanredni profesor** na Fizičkom odsjeku Prirodoslovno-matematičkog fakulteta u Zagrebu, (2009-2013).
- **Docent** na Fizičkom odsjeku Prirodoslovno-matematičkog fakulteta u Zagrebu, (2003-2008).
- **Postdoktorand** na Technion-u, Israel Institute of Technology, Haifa, Israel, (2002-2004) kod Prof. Mordechai Segeva.
- **Znanstveni novak** na Fizičkom odsjeku Prirodoslovno-matematičkog fakulteta u Zagrebu, (1998-2003).

- **Prodekan za znanost i doktorske studije 2016 - 2018**, Prirodoslovno-matematički fakultet Sveučilišta u Zagrebu
- **Pročelnik Fizičkog odsjeka 2014 - 2016**, Fizički odsjek Prirodoslovno-matematički fakultet Sveučilište u Zagrebu

- **Zamjenik pročelnika Fizičkog odsjeka 2012 - 2014**, Fizički odsjek Prirodoslovno-matematički fakultet Sveučilište u Zagrebu

Odlukom matičnog odbora od 12.3.2018. godine izabran u znanstveno zvanje znanstveni savjetnik u trajnom zvanju.

- Gostujući profesor na Nankai University, Tianjin, Kina (2019 – 2022, 2023 -)
- Gostujući znanstvenik na Massachusetts Institute of Technology (2018-2019)

Priznanja i nagrade

- Rektorova nagrada za najbolji studentski rad (1995).
- Godišnja državna nagrada za znanost 2010. godine.
- Nagrada Andrija Mohorovičić Sveučilišta u Zagrebu 2019. godine.
- Nagrada HAZU za najveća znanstvena i umjetnička dostignuća u RH za 2022. godinu

Poznavanje stranih jezika

- Izvršno poznavanje **engleskog** jezika (govorenje, čitanje, pisanje).
- Završen četvrti stupanj **francuskog** jezika u školi stranih jezika.

Projekti

Voditelj projekata

- Projekt: Provedba vrhunskih istraživanja u sklopu Znanstvenog centra izvrsnosti za kvantne i kompleksne sustave te reprezentacije Liejevih algebri (KK.01.1.1.01.0004)
Vrijednost: 36.956.624,09 kn
Trajanje: 2017. –2023.
Financijer: EU fondovi
- Projekt: Sintetička magnetska polja uz međudjelovanja i anyoni (<http://www.phy.pmf.unizg.hr/~hbuljan/hrzz.html>)
Vrijednost: 777.733,00 kn
Trajanje: 2017.-2021.
Financijer: Hrvatska zaklada za znanost (HRZZ)
- Projekt: *Pseudomagnetic forces and fields for atoms and photons*
Vrijednost: 1500000,00 kn
Trajanje: 2013.-2015.
Financijer: Jedinstvo uz pomoć znanja (UKF – Svjetska banka)
- Projekt *Nonlinear phenomena and wave dynamics in photonic systems* (119-0000000-1015)
Vrijednost: 500000,00 kn
Trajanje 2007.-2013.
Financijer: Ministarstvo znanosti i obrazovanja

Projekti s gospodarskim subjektima

- Projekt: Razvoj naprednog IT sustava za precizno određivanje broja ljudi u otvorenim i zatvorenim prostorima (KK.01.2.1.02.0016).

Bilateralni projekti:

- 2016-2018 Glavni istraživač na hrvatsko-srpskom bilateralnom projektu (u suradnji s Dr. Ivanom Vasić, Institut za fiziku Beograd, Srbija)
- 2013-2014 Glavni istraživač na projektu *Optics and photonics in new materials and plasma* koji financira Sveučilište u Zagrebu (www.unizg.hr) kao potporu istraživanjima
- 2007-2009 Glavni istraživač na bilateralnom projektu hrvatsko njemačke suradnje (zajedno s Prof.Dr. Thomas Gasenzerom, Institut for Theoretical Physics, Heidelberg) financiran od MZOŠ i DAAD
- 2008-2010 Glavni istraživač na bilateralnom projektu hrvatsko izraelske suradnje (zajedno s Prof Dr. Mordechai Segevom, Technion, Israel Institute of Technology) financiran od MZOŠ i *Ministry of Science of the State of Israel*

Znanstveni radovi

Autor i koautor 88 radova u časopisima koje indeksira baza Web of Science. Radovi su citirani preko 4200 puta prema bazi WoS, odnosno preko 5500 puta prema bazi Google Scholar. Prema bazi WoS h-indeks je 30, a prema Google Scholar 32.

Svi radovi objavljeni su u respektabilnim znanstvenim časopisima jedan rad u časopisu Nature, dva rada u časopisu Science, jedan rad u Nature Physics, dva rada u Nature Communications, dva rada u Science Advances, 9 radova u Physical Review Letters.

Popis svih radova je na kraju CV-a.

Organizacijske aktivnosti

- Organizacijski odbor za radionicu Workshop on Topological effects and synthetic gauge/magnetic fields for atoms and photons (synthetic.ifs.hr), 29.9.-1.10.2015. Zagreb, Croatia (international event)
- Organizacijski odbor za radionicu The European Workshop on Epitaxial Graphene and 2D Materials, Primošten, 2014 (international event)
- Organizacijski odbor i programski odbor za 6. Znanstveni skup HFD-a, Primošten, 2009
- Organizacijski odbor, 7th International Symposium on Ultrafast Surface Dynamics, Brijuni, 2010
- Akademski i organizacijski odbor, 41st International Physics Olympiad, Zagreb, 2010

Recenzent

- Recenzent za slijedeće časopise:
 - Physical Review Letters
 - Physical Review A
 - Physical Review B
 - Physical Review E
 - Nature Photonics
 - Nature Nanotechnology
 - Nature Materials
 - Nature Communications

- Light, Science and Applications
- Scientific Reports
- Optics Letters
- Optics Express
- Optics Communications
- Journal of the Optical Society of America
- Physics Letters A
- Europhysics Letters
- Laser and Photonics Reviews
- Journal of the American Chemical Society
- New Journal of Physics
- Nonlinearity
- Recenzent prijedloga projekata agencija EU zemalja
 - Hrvatska zaklada za znanost
 - Izraelska zaklada za znanost
 - Belgijska zaklada za znanost

Međunarodna suradnja

- Prof. Marin Soljačić, Massachusetts Institute of Technology, SAD.
- Prof. Zhigang Chen, Nankai University, Kina.
- Akademik Mordechai Segev, Technion, Israel

Mentorstvo

- Mentor doktorske disertacije *Nonequilibrium dynamics of exactly solvable one-dimensional many-body Bose systems*, Dario Jukić (2012).
- Mentor doktorske disertacije *Electrodynamical properties of graphene and their technological applications*, Marinko Jablan (2012).
- Mentor doktorske disertacije *Korelacije u jako-međudjelujućim višečestičnim jednodimenzionalnim sustavima*, Karlo Lelas (2012).
- Mentor doktorske disertacije *Synthetic magnetism for quantum gases and photonic lattices*, Tena Dubček (2017).
- Mentor doktorske disertacije *Proposals for signatures and realizations of anyons*, Marija Todorić (2021).
- Mentor doktorske disertacije *Anyons, Zitterbewegung and dynamical phase transitions in topologically nontrivial systems*, Frane Lunić (2022).
- Mentor doktorske disertacije *Mapping of topological properties of photonic lattices*, Ema Jajtić (2022).
- Mentor mag. phys. Nikole Drpića, izrada doktorske disertacije u tijeku
- Mentor preko 40 diplomskih radova.
- Mentor studentskog rada za koji je Marinko Jablan dobio nagradu Znanost (2008) dodijeljenu od Nacionalne zaklade za znanost
- Mentor studentskog rada za koji je Dario Jukić dobio nagradu Znanost (2009) dodijeljenu od Nacionalne zaklade za znanost
- Mentor studentskog rada za koji je Tena Dubček dobila nagradu L'Oreal Za žene u znanosti 2016. godine
- Mentor studentskog rada za koji je Ozana Čelan dobila Rektorovu nagradu (2009).

Popis znanstvenih radova

(88) H. Buljan, Z. Chen, Spin-selective transitions between quantum Hall states. *Nat. Photon.* **17**, 838–840 (2023). <https://doi.org/10.1038/s41566-023-01288-9>

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- (86) S. Lei, S. Xia, J. Wang, X. Liu, L. Tang, D. Song, J. Xu, H. Buljan, and Z. Chen, Mapping and Manipulation of Topological Singularities: From Photonic Graphene to T-Graphene, *ACS Photonics*, 2023, <https://doi.org/10.1021/acsp Photonics.2c01695>
- (85) Y. Zhang, D. Bongiovanni, Z. Wang, X. Wang, S. Xia, Z. Hu, D. Song, D. Jukić, J. Xu, R. Morandotti, H. Buljan and Z. Chen, Realization of photonic p-orbital higher-order topological insulators, *eLight* (2023) 3:5, <https://doi.org/10.1186/s43593-022-00039-7>
- (84) I. Komis, D. Kaltsas, S. Xia, H. Buljan, Z. Chen, and K. G. Makris, Robustness versus sensitivity in non-Hermitian topological lattices probed by pseudospectra, *Phys. Rev. Research* **4**, 043219 (2022),
- (83) H. Buljan, D. Jukić, Z. Chen, PHOTONIC NETWORKS: Loss leads the way to utopia, *Nature Physics*, 18, 371–372 (2022).
- (82) B. Klajn, S. Domazet, D. Jukić, and H. Buljan, Exactly solvable model for anyons with non-Abelian flux, *Phys. Rev. A* **104**, 052217 (2021).
- (81) Domenico Bongiovanni, Dario Jukić, Zhichan Hu, Frane Lunić, Yi Hu, Daohong Song, Roberto Morandotti, Zhigang Chen, and Hrvoje Buljan, Dynamically Emerging Topological Phase Transitions in Nonlinear Interacting Soliton Lattices, *Phys. Rev. Lett.* **127**, 184101 (2021)
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- (79) Xiuying Liu, Frane Lunić, Daohong Song, Zhixuan Dai, Shiqi Xia, Liqin Tang, Jingjun Xu, Zhigang Chen, Hrvoje Buljan, Wavepacket Self-Rotation and Helical Zitterbewegung in Symmetry-Broken Honeycomb Lattices, *Laser Photonics Rev.* 15, 2000563, (2021).
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- (72) Lunic, Frane; Todoric, Marija; Klajn, Bruno; et al., Exact solutions of a model for synthetic anyons in a noninteracting system, *PHYSICAL REVIEW B*, 101 115139 (2020).
- (71) Yang, Yi; Peng, Chao; Zhu, Di; et al. Synthesis and observation of non-Abelian gauge fields in real space, *SCIENCE* 365, 1021 (2019).
- (70) Ana Hudomal, Ivana Vasić, Hrvoje Buljan, Walter Hofstetter, and Antun Balaž, Dynamics of weakly interacting bosons in optical lattices with flux, *Phys. Rev. A* **98**, 053625 (2018).
- (69) Marija Todoric, Dario Jukić, Danko Radić, Marin Soljačić, and Hrvoje Buljan, *Quantum Hall Effect with Composites of Magnetic Flux Tubes and Charged Particles*, *Phys. Rev. Lett.* **120**, 267201 (2018).
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- (67) Tena Dubček, Bruno Klajn, Robert Pezer, Hrvoje Buljan, and Dario Jukić, Quasimomentum distribution and expansion of an anyonic gas, *Phys. Rev. A* **97**, 011601(R) (2018).
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- (64) N. Šantić, T. Dubček, D. Aumiler, H. Buljan, T. Ban, Synthetic Lorentz force in an expanding cold atomic gas, *JOSA B* **34** (6), 1264-1269 (2017).
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- (57) N. Šantić, T. Dubček, D. Aumiler, H. Buljan, T. Ban, Experimental Demonstration of a Synthetic Lorentz Force by Using Radiation Pressure, *Scientific Reports* **5**, **13485** (2015)
- (56) Jorge Bravo-Abad, Ling Lu, Liang Fu, Hrvoje Buljan and Marin Soljačić, Weyl points in photonic-crystal superlattices, *2D Mater.* **2**, 034013 (2015).
- (55) Tena Dubček, Colin J. Kennedy, Ling Lu, Wolfgang Ketterle, Marin Soljačić, and Hrvoje Buljan, Weyl Points in Three-Dimensional Optical Lattices: Synthetic Magnetic Monopoles in Momentum Space, *Phys. Rev. Lett.* **114**, 225301 (2015)
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- "Fermi-Bose transformation for a time-dependent Lieb-Liniger gas,"
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"Incoherent modulation instability in a nonlinear photonic lattice"
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"Spatial supercontinuum generation in nonlinear photonic lattices"
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"Incoherent white-light solitons in nonlinear periodic lattices"
Phys. Rev. E 73, 056608 (2006).
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"Incoherent solitons in instantaneous nonlocal nonlinear media"
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**Rad posebno istaknut u Virtual Journal of Ultrafast Science, June 2006.
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"Incoherent matter-wave solitons and pairing instability in an attractively interacting Bose-Einstein condensate"
Phys. Rev. Lett. 95, 180401 (2005).
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"Gap random-phase lattice solitons"
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"Partially coherent waves in nonlinear periodic lattices"
Stud. Appl. Math. 115, 173 (2005), revijalni rad
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"Brillouin zone spectroscopy of nonlinear photonic lattices"
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**Rad istaknut/komentiran u rubrici Physics Update časopisa Physics Today, May 2005.

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