

Curriculum vitae

Email: hbuljan@phy.hr

Hrvoje Buljan

Adresa:
Ul. Grada Vukovara 240
10000 Zagreb

Mob: 091 460 5902



Osobni podatci

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

Narodnost i državljanstvo: Hrvat, Republika Hrvatska

Obitelj: dvoje djece: Iva Buljan (1997) i Ivan Buljan (1999)

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)**
- **Gostujući znanstvenik na Massachusetts Institute of Technology (2018-2019)**

Priznanja i nagrade

- Stipendist zaklade Lady Davis Foundation (2003).
- Rektorova nagrada za najbolji studentski rad (1995).
- **Godišnja državna nagrada za znanost 2010. godine.**
- **Nagrada Andrija Mohorovičić Sveučilišta u Zagrebu 2019. godine.**

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. -2022.
Financijer: EU fondovi
- **Projekt: Sintetička magnetska polja uz međudjelovanja i anyoni**
(<http://www.phy.pmf.unizg.hr/~hibuljan/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), korisnik projekta je Aduro ideje d.o.o. Uloga na projektu: Glavni istraživač na PMF-u

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*

FP7 projekti:

- 2009-2012 Suradnik na projektu FP7 SOLeNeMaR (*Strenghtening the SOLid-state research capacities in Zagreb by the introduction of Nuclear Magnetic Resonance method*) glavni istraživač: Prof.dr.sc. Miroslav Požek

Izrada strateških dokumenata

- **Strateški program znanstvenih istraživanja PMF-a od 2018. do 2023.**
Kao prodekan za znanost i doktorske studije PMF-a, bio sam glavni autor (zajedno s prof. dr. sc. Hrvojem Šikićem) Strateškog programa znanstvenih istraživanja PMF-a od 2018. do 2023.
- **Strategija razvoja PMF-a Sveučilišta u Zagrebu za razdoblje 2015.-2020.**
Kao pročelnik Fizičkog odsjeka PMF-a sudjelovao sam u izradi Strategije razvoja PMF-a 2015-2020
- **Strategija razvoja Fizičkog odsjeka Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu 2014. - 2019.**
Kao zamjenik pročelnika Fizičkog odsjeka PMF-a sudjelovao sam u izradi Strategije razvoja FO 2014-2019.

Znanstveni radovi

Autor sam i koautor **83 znanstvena rada objavljena u časopisima koje indeksira baza Web of Science**. Radovi su citirani preko **4000 puta prema bazi WoS**, odnosno preko **5000 puta prema bazi Google Scholar**. Prema bazi WoS h-indeks je **29**, a prema Google Scholar **31**.

Svi radovi objavljeni su u respektabilnim znanstvenim časopisima jedan rad u časopisu *Nature*, dva rada u časopisu *Science*, 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 sposobnosti

- 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 Simposium 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.

Mentorstvo

- Mentor doktorske disertacije *Nonequilibrium dynamics of exactly solvable one-dimensional many-body Bose systems*, Dario Jukić (2012).

- **Mentor** doktorske disertacije *Electrodynamic properties of graphene and their technological applications*, Marinko Jablan (2012).
- **Mentor** doktorske disertacije *Korelacije u jako-međudjelujućim višestručnim 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 Todorčić (2021).
- **Mentor** mag. phys. Frane Lunića, izrada doktorske disertacije u tijeku
- **Mentor** mag. phys. Eme Jajtić, izrada doktorske disertacije u tijeku
- **Mentor** preko 35 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

(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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<https://doi.org/10.1038/s41377-021-00607-5>

(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).

(78) Shiqi Xia, Dimitrios Kaltsas, Daohong Song, Ioannis Komis, Jingjun Xu, Alexander Szameit, Hrvoje Buljan, Konstantinos G. Makris, Zhigang Chen, Nonlinear tuning of PT symmetry and non-Hermitian topological states, *Science* **372**, 6537 (2021).

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Berry phase for a Bose gas on a one-dimensional ring, *PHYSICAL REVIEW A* **102**, 013322 (2020).
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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).
- (68) Francisco Machado, Nicholas Rivera, Hrvoje Buljan, Marin Soljačić, and Ido Kaminer, *Shaping Polaritons to Reshape Selection Rules*, *ACS Photonics* **5**, 3064–3072 (2018).
- (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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- (58) Tena Dubček, Karlo Lelas, Dario Jukić, Robert Pezer, Marin Soljačić and Hrvoje Buljan, The Harper–Hofstadter Hamiltonian and conical diffraction in photonic lattices with grating assisted tunneling, *New J. Phys.* 17, 125002 (2015).
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- (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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- (51) H. Buljan, M. Jablan, and M. Soljačić, “*Damping of Plasmons in Graphene*”, *Nature Photonics* 7, 346 (2013), News & Views article.
- (50) M. Jablan, M. Soljačić, and H. Buljan, “*Plasmons in graphene: Fundamental properties and potential applications*” *Proceedings of the IEEE* 101, 1689 (2013), revijalni rad.
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- (47) K. Lelas, T. Ševa, H. Buljan, and J. Goold, "The pinning quantum phase transition in a Tonks Girardeau gas: diagnostics by ground state fidelity and the Loschmidt echo," *Phys. Rev. A* 86, 033620 (2012).
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- (35) K. Lelas, D. Jukic, and H. Buljan, "Ground state properties of a one-dimensional strongly-interacting Bose-Fermi mixture in a double-well potential," *Phys. Rev. A* 80, 053617 (2009); selected for the December 2009 issue of *Virtual Journal of Atomic Quantum Fluids*.
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"Spontaneous pattern formation upon incoherent waves: From modulation-instability to steady-state," *Optics Express* 16, 7818 (2008).
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"Fermi-Bose transformation for a time-dependent Lieb-Liniger gas,"
Phys. Rev. Lett. 100, 080406 (2008).
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Phys. Rev. A 76, 043609 (2007).
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"Momentum distribution dynamics of a Tonks-Girardeau gas: Bragg reflections of a quantum many-body wave packet"
Phys. Rev. Lett. 98, 240403 (2007).
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"Incoherent modulation instability in a nonlinear photonic lattice"
Optics Express 15, 4623 (2007).
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"Dark stationary matter waves via parity-selective filtering in a Tonks-Girardeau gas"
Phys. Rev. A 74, 043610 (2006).
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"Spatial supercontinuum generation in nonlinear photonic lattices"
Opt. Lett. 31, 2320 (2006).
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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"
Phys. Rev. E 73, 015601(R), (2006).
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"Observation of random-phase gap solitons in photonic lattices"
Opt. Lett. 31, 483 (2006).
**Rad posebno istaknut u *Virtual Journal of Ultrafast Science*, June 2006.
- (20) H. Buljan, M. Segev, and A. Vardi
"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"
Optics Express 13, 5013 (2005).
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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"
Phys. Rev. Lett. 94, 163902 (2005).

**Rad istaknut/komentiran u rubrici Physics Update časopisa Physics Today, May 2005.

(16) J.W. Fleischer, G. Bartal, O. Cohen, T. Schwartz, O. Manela, B. Freedman, M. Segev, H. Buljan, N.K. Efremidis,
"Spatial photonics in nonlinear waveguide arrays"
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**Pozvani rad revijalnog karaktera

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