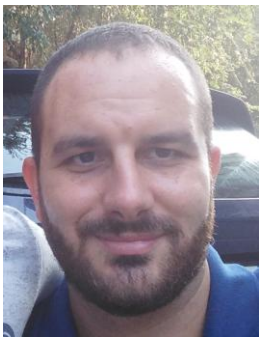
CURRICULUM VITAE



Name: **Stanko Nikolić, Ph.D. in Physics**
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Education

2008 - 2014: Ph.D. Physics
Faculty of Physics, University of Belgrade, Serbia (www.ff.bg.ac.rs)
Doctoral Thesis: "*Electromagnetically Induced Transparency and Slow Light in Rubidium Buffer Gas Cell*"
(Award: Best doctoral thesis in the Institute of Physics Belgrade in 2014.)

2007 - 2008: M.Sc. Physics
Faculty of Physics, University of Belgrade, Serbia
Modules: Numerical Algorithms and Their Implementation in C, Quantum and Nonlinear Optics, Quantum Cryptography and Computation

2001 - 2007: B.Sc. Physics
Faculty of Physics, University of Belgrade, Serbia
Graduation Thesis: "*The application of an acousto-optic modulator for amplitude modulation and switching the laser beam in red and infrared region*"

1997 - 2001: Mathematical High School, Belgrade, Serbia (http://www.mg.edu.rs/en)

Current Positions

October 2015 - present: Postdoctoral Research Associate, Texas A&M University at Qatar (www.qatar.tamu.edu)
(several independent engagements, total of 3.5 years)

- Main research role and a software architect in the project *"Early diagnosis of proteionpathies using massively parallel nanospectroscopy with single molecule sensitivity. Advanced clinical diagnostics for the development of personalized treatment"*. The project is supported by Qatar National Research Fund under the call *Path towards Precision Medicine*. The project goal is to use Fluorescence Correlation Spectroscopy and mathematical analysis tools for ultrasensitive detection of structured peptide/protein aggregates with single-molecule sensitivity for early detection of neurodegenerative diseases such as Alzheimer's and Parkinson's disease. The project ends on April 15th, 2024.
- Research in the field of theoretical nonlinear optics - Calculating the analytical, numerical and Talbot carpet solutions of the Nonlinear Schrödinger Equations (NLSE) hierarchy (standard NLSE, Hirota, Quintic equation etc), analysis of modulation instability and Fourier spectra and visualization of obtained solutions. Developing CUDA C software for massively parallel numerical calculations

2007 - present: Institute of Physics Belgrade, University of Belgrade, Serbia (www.ipb.ac.rs)
(*Senior Research Associate* since September 2020)

- Experimental work in the field of Electromagnetically Induced Transparency, Slow Light, Storage of Light and Free Induction Decay in Rb buffer gas cell. Theoretical work in nonlinear optics and nonlinear dynamics
- Developing of the FPGA digital design, C++ software and LabView projects for full control of the experiment by personal computer, data acquisition and data processing. Experimental control includes several tasks: 1. Programming the digital-to-analog converters by FPGA chip to generate analog voltage signals by entering mathematical expressions (as strings) in C++ application that communicates with FPGA board, 2. Programming the analog-to-digital converters by FPGA for acquiring voltage signals from experiment, 3. Visualization of input voltage signals in the oscilloscope form in C++ GUI, 4. Analyzing the experimental results by C++ application

2013 - present: External Researcher, Karolinska Institutet, Stockholm, Sweden (http://www.cmm.ki.se)

- Developing of the Windows C++ application (GUI) for control of the experiment in the field of multifocal fluorescence correlation spectroscopy. The software has several tasks: 1. Communication with two single-photon sensitive cameras, each containing 32 x 32 matrix of independent avalanche-photodiodes (pixels), 2. Graphical presentation of raw data (2048 independent photon counts over time on both cameras), 3. Calculation of 1024 auto-correlation (ACF) and 24576 cross-correlation functions (CCF), both serially on CPU and in parallel by using CUDA platform on NVIDIA graphical processor (computational time reduced over 60 times), 4. Drawing the graphs, diffusion maps and histograms from

ACF and CCF, and 5. Conducting the fitting procedures over all ACF and CCF in order to numerically characterize biological samples

Previous Positions

September 2012 - July 2020: Teacher in Physics, Mathematical High School, Belgrade, Serbia

- Advanced curriculum for high-school students talented in computing, mathematics and physics (top 1% students in Serbia - the school with High National Distinction Status). According to the number of students attending International Physics, Mathematics, and Informatics Olympiads this school ranks as one of the best in the world.

May - July 2016: Teaching Assistant (Course 208 - Electromagnetism and Optics) at Science Department, Texas A&M University at Qatar

2009 - 2010 (six months): Visiting student at Center for Ultracold Atoms at Massachusetts Institute of Technology, Cambridge, USA (group of professor Vladan Vuletić) http://www.rle.mit.edu/people/directory/vladan-vuletic/

- Designed and developed a device for photons detection. Besides projecting digital electronic circuit, the project consisted of a FPGA digital design (in Verilog) that enabled Xilinx Spartan-3 FPGA Module to count electrical photon pulses and send the data to digital-to-analog converter. User interface program was developed in Microsoft Visual Studio 2008 (C#)
- Designed software for optimization of an optical system in order to obtain chromatic dispersion compensation in one of the group experiment

Additional experience

2022 - Completed *"Deep Learning"* Specialization on Coursera (5 courses in overall: Neural Networks and Deep Learning; Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization; Structuring Machine Learning Projects; Convolutional Neural Networks; Sequence Models).
Website: https://www.coursera.org/specializations/deep-learning

2019 - Completed "*Machine learning"* course on Coursera: https://www.coursera.org/learn/machine-learning

2013 - Attended the course "*Database design and programming with SQL*" by Oracle Academy and got the certificate to teach the basics of database design and programming in high schools

2012 - Attended **"***Cineca Summer School of Parallel Computing"* (two weeks), Casalecchio di Reno - Bologna, Italy

Computer skills

- *Programming:* Pascal, C/C++, Borland/Embarcadero C++ Builder and Delphi, Visual Basic, FPGA digital design (VHDL and Verilog), Microsoft Visual Studio 2008, NVIDIA CUDA, PHP
- *Web technologies:* PHP, HTML, CSS, JavaScript, JSON, Ajax
- *Algorithms:* Dynamical programming, graph theory, searching arrays and dynamical structures
- *Databases:* Interbase, MySQL
- *Software:* MS Office (Excel, Access, Word, Power Point), Origin, LaTeX, Adobe Photoshop, Corel Draw
- *Operating systems*: Windows and Linux

Languages: Serbian (mother tongue), English (fluent)

I. Scientific production (Papers published in peer reviewed international journals)

30. **Stanko N. Nikolić**, Najdan B. Aleksić, Wieslav Krolikowski, Milivoj R. Belić, Nail Akhmediev:
"Wave amplification outside of the modulation instability band"
Romanian Journal of Physics **68**, 115 (2023)

29. **Stanko N. Nikolić**, Sho Oasa, Aleksandar J. Krmpot, Lars Terenius, Milivoj R. Belić, Rudolf Rigler, Vladana Vukojević:
"Mapping the direction of nucleocytoplasmic transport of glucocorticoid receptor (GR) in live cells using two-foci cross-correlation in massively parallel Fluorescence Correlation Spectroscopy (mpFCS)"
Analytical Chemistry (2023), DOI: **10.1021/acs.analchem.3c01427**

28. Mihajlo D. Radmilović, Ivana T. Drvenica, Mihailo D. Rabasović, Vesna Lj. Ilić, Danica Pavlović, Sho Oasa, Vladana Vukojević, Mina Perić, **Stanko N. Nikolić**, Aleksandar J. Krmpot:
"Interactions of ultrashort laser pulses with hemoglobin: Photophysical aspects and potential applications"
International Journal of Biological Macromolecules **244**, 125312 (2023)

27. Sarah Alwashahi, Najdan B. Aleksić, Milivoj R. Belić, **Stanko N. Nikolić**:
"Kuznetsov–Ma rogue wave clusters of the nonlinear Schrödinger equation"
Nonlinear Dynamics **111**, 12495 (2023)

26. Tanja Pajić, Nataša V. Todorović, Miroslav Živić, **Stanko N. Nikolić**, Mihailo D. Rabasović, Andrew H. A. Clayton, Aleksandar J. Krmpot:
"Label-free third harmonic generation imaging and quantification of lipid droplets in live filamentous fungi"
Scientific Reports **12**, 18760 (2022)

25. Milivoj R. Belić, **Stanko N. Nikolić**, Omar A. Ashour, Najdan B. Aleksić:
"On different aspects of the optical rogue waves nature"
Nonlinear Dynamics **108**, 1655 (2022)

24. Omar A. Ashour, Siu A. Chin, **Stanko N. Nikolić**, Milivoj R. Belić:
"Higher-order breathers as quasi-rogue waves on a periodic background"
Nonlinear Dynamics **107**, 3819 (2022)

23. **Stanko N. Nikolić**, Sarah Alwashahi, Omar A. Ashour, Siu A. Chin, Najdan B. Aleksić, Milivoj R. Belić:
"Multi-elliptic rogue wave clusters of the nonlinear Schrödinger equation on different backgrounds"
Nonlinear Dynamics **108**, 479 (2022)

22. Sho Oasa, Aleksandar J. Krmpot, **Stanko N. Nikolić**, Andrew H. A. Clayton, Igor F. Tsigelny, Jean-Pierre Changeux, Lars Terenius, Rudolf Rigler, Vladana Vukojević:
"Dynamic Cellular Cartography: Mapping the Local Determinants of Oligodendrocyte Transcription Factor 2 (OLIG2) Function in Live Cells Using Massively Parallel Fluorescence Correlation Spectroscopy Integrated with Fluorescence Lifetime Imaging Microscopy (mpFCS/FLIM)"
Analytical Chemistry **93**, 12011−12021 (2021).

21. Aleksandar J. Krmpot, **Stanko N. Nikolić,** Sho Oasa, Dimitrios K. Papadopoulos, Marco Vitali, Makoto Oura, Shintaro Mikuni, Per Thyberg, Simone Tisa, Masataka Kinjo, Lennart Nilsson, Lars Terenius, Rudolf Rigler, Vladana Vukojević:
"Functional Fluorescence Microscopy Imaging: Quantitative Scanning-Free Confocal Fluorescence Microscopy for the Characterization of Fast Dynamic Processes in Live Cells"
Analytical Chemistry **91**, 11129 (2019).

20. **Stanko N. Nikolić**, Omar A. Ashour, Najdan B. Aleksić, Yiqi Zhang, Milivoj R. Belić, Siu A. Chin:
"Talbot carpets by rogue waves of extended nonlinear Schrödinger equations"
Nonlinear Dynamics **97**, 1215 (2019).

19. **Stanko N. Nikolić**, Omar A. Ashour, Najdan B. Aleksić, Milivoj R. Belić, Siu A. Chin:
"Breathers, solitons and rogue waves of the quintic nonlinear Schrödinger equation on various backgrounds"
Nonlinear Dynamics **95**, 2855 (2019)**.**

18. **Stanko N. Nikolić**, Najdan B. Aleksić, Omar A. Ashour, Milivoj R. Belić, Siu A. Chin:
"Systematic generation of higher-order solitons and breathers of the Hirota equation on different backgrounds"
Nonlinear Dynamics **89**, 1637 (2017).

17. Siu A. Chin, Omar A. Ashour, **Stanko N. Nikolić**, Milivoj R. Belić:
"Peak-height formula for higher-order breathers of the nonlinear Schrödinger equation on nonuniform backgrounds"
Phys. Rev. E **95**, 012211 (2017)

16. Siu A. Chin, Omar A. Ashour, **Stanko N. Nikolić**, Milivoj R. Belić:
"*Maximal intensity higher-order Akhmediev breathers of the nonlinear Schrödinger equation and their systematic generation*"
Phys. Lett. A **380**, 3625-3629 (2016)

15. Dimitrios K. Papadopoulos, Aleksandar J. Krmpot, **Stanko N. Nikolić**, Robert Krautz, Lars Terenius, Pavel Tomancak, Rudolf Rigler, Walter J. Gehring, Vladana Vukojević:
"Probing the kinetic landscape of Hox transcription factor-DNA binding in live cells by massively parallel Fluorescence Correlation Spectroscopy"
Mechanisms of Development **138**, 218-225 (2015)

14. Krmpot Aleksandar J, **Nikolic Stanko N**, Vitali Marco, Papadopoulos Dimitrios K, Oasa Sho, Thyberg Per, Tisa Simone, Kinjo Masataka, Nilsson Lennart, Gehring Walter J, Terenius Lars, Rigler Rudolf, Vladana Vukojević:
"*Quantitative confocal fluorescence microscopy of dynamic processes by multifocal fluorescence correlation spectroscopy*" (Proceedings Paper)
ADVANCED MICROSCOPY TECHNIQUES IV; AND NEUROPHOTONICS II **9536** (2015)

13. **S. N. Nikolić,** M. Radonjić, N. M. Lučić, A. J. Krmpot, B. M. Jelenković:
"*Transient development of Zeeman electromagnetically induced transparency during propagation of Raman-Ramsey pulses through Rb buffer gas cell*"
J. Phys. B: At. Mol. Opt. Phys. **48**, 045501 (2015)

12. Marco Vitali, Danilo Bronzi, Aleksandar J. Krmpot, **Stanko Nikolić**, Franz-Josef Schmitt, Cornelia Junghans, Simone Tisa, Thomas Friedrich, Vladana Vukojević, Lars Terenius, Franco Zappa, Rudolf Rigler:
"A single-photon avalanche camera for fluorescence lifetime imaging microscopy and correlation spectroscopy"
Journal of Selected Topics in Quantum Electronics **20**, 3804010 (2014)

11. **S. N. Nikolić,** M. Radonjić, N. M. Lučić, A. J. Krmpot, B. M. Jelenković:
"Optical Ramsey fringes observed during the temporal evolution of Zeeman coherences in Rb buffer gas cell",
Physica Scripta **T162**, 014038 (2014)

10. **S. N. Nikolić**, A. J. Krmpot, N. M. Lučić, B. V. Zlatković, M. Radonjić, B. M. Jelenković:
"Effects of laser beam diameter on electromagnetically induced transparency due to Zeeman coherences in Rb vapor"
Phys. Scr. **T157**, 014019 (2013)

9. S M Ćuk, A J Krmpot, M Radonjić, **S N Nikolić,** B M Jelenković:
"Influence of a laser beam radial intensity distribution on Zeeman electromagnetically induced transparency line-shapes in the vacuum Rb cell"
J. Phys. B: At. Mol. Opt. Phys. **46**, 175501 (2013)

8. **Stanko N Nikolić**, Viktor Batić, Bratimir Panić, Branislav M. Jelenković:
"Field programmable gate array based arbitrary signal generator and oscilloscope for use in slow light and storage of light experiments"
Rev. Sci. Instrum. **84**, 063108 (2013)

7. **S N Nikolić**, M Radonjić, A J Krmpot, N M Lučić, B V Zlatković, B M Jelenković:
"Effects of laser beam profile on Zeeman electromagnetically induced transparency in Rb buffer gas cell"
J. Phys. B: At. Mol. Opt. Phys. **46** 075501 (2013)

6. **S N Nikolić**, V Djokić, N M Lučić, A J Krmpot, S M Ćuk, M Radonjić, B M Jelenković:
"The connection between electromagnetically induced transparency in the Zeeman configuration and slow light in hot rubidium vapor"
Phys. Scr. **T149**, 014009 (2012).

5. A. J. Krmpot, M. Radonjić, S. M. Ćuk, **S. N. Nikolić**, Z. D. Grujić, B. M. Jelenković:
"Evolution of dark state of an open atomic system in constant intensity laser field"
Phys. Rev. A **84**, 043844 (2011)

4. A. J. Krmpot, **S. N. Nikolić**, S. M. Ćuk, M. Radonjić, B. M. Jelenković:
"Dark Hanle resonances narrowing by blocking the central part of the Gaussian laser beam"
Proc. of SPIE **7747**, 774700E (2011)

3. S. M. Ćuk, M. Radonjić, A. J. Krmpot, **S. N. Nikolić**, Z. D. Grujić, B. M. Jelenković:
"Influence of laser beam profile on electromagnetically induced absorption"
Phys. Rev. A **82**, 063802 (2010)

2. A. J. Krmpot, S. M. Ćuk, **S. N. Nikolić**, M. Radonjić, Z. D. Grujić, B. M. Jelenković:
"Laser Beam Profile Influence on Dark Hanle Resonances in Rb Vapor"

ACTA PHYSICA POLONICA A **116,** No. 4, pages 563-565 (2009)

1. A. J. Krmpot, S. M. Ćuk, **S. N. Nikolić**, M. Radonjić, D. G. Slavov, B. M. Jelenković:
"Dark Hanle resonances from selected segments of the Gaussian laser beam cross-section"
OPTICS EXPRESS **17,** issue 25, pp. 22491-22498 (2009)