Stefan Karatodorov, Ph.D.

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Work experience

09.2022 – now
Research and Technology Associate
Luxembourg Institute of Science and Technology
Application of Coherent Rayleigh Brillouin Scattering technique for diagnostics of neutral gases and neutral gas flows

12.2020 – 08.2022
Researcher
Institute of Solid State Physics, Bulgarian Academy of Sciences, Sofia, Bulgaria
Commissioning and applications of femtosecond laser system for micro- and nano-processing of materials
Measurement of non-linear properties of optical media
Development of measurement system for laser ablation threshold determination
Laser scanning confocal microscopy for characterization of laser-processed materials

01.2019 – 11.2020
Postdoctoral Fellow – Ultrashort laser-driven generation of X-rays
ELI-Beamlines, Dolny Brezany, Czech Republic
Commissioning of a liquid metal Plasma X-ray source
Planning and installation of a Betatron X-ray source
Development of a multi-pass interferometer for gas jet density characterization

10.2018 – 01.2019
Researcher on National Scholarship of the Slovak Republic
Comenius University in Bratislava, Bratislava, Slovakia
Development of an optical emission source laser-induced plasma assisted spark discharge

11.2017 – 09.2018
Researcher
Institute of Solid State Physics, Bulgarian Academy of Sciences, Sofia, Bulgaria
Laser-induced breakdown spectroscopy, Laser-induced fluorescence, Glow discharge physics, Optical sensors

02.2010 – 10.2017
Researcher Assistant
Institute of Solid State Physics, Bulgarian Academy of Sciences, Sofia, Bulgaria
Laser-induced breakdown spectroscopy, Laser-induced fluorescence, Glow discharge physics, Optical sensors, Plasma modelling

Education

2012 – 2017
Ph.D., Institute of Solid State Physics in Physics of Wave Processes.
Thesis title: *Combined Plasma Source for Emission Spectroscopy: Laser-induced Plasma in Hollow Cathode Discharge.*

2009 – 2011
M.Sc., Sofia University in Quantum Electronics and Laser Technology.
Thesis title: *Monte Carlo simulation of hollow cathode discharge.*

2005 – 2009
B.Sc., Sofia University in Engineering Physics.
Thesis title: *Hollow cathode metal vapour lasers: Application of the Monte Carlo method for discharge analysis.*

Skills

Languages	Fluent in Bulgarian and English / Basic competence in Dutch
Coding	General competence in Matlab, Python, Labview / LaTeX, OriginLab, QtiPlot, Linux/Unix
Misc.	CAD design, 3D printing, Computer Networking, Electric hoist operator/binder

Awards and Achievements

2022 **Best poster award at ISCMP22**, International School on Condensed Matter Physics held in Varna, Bulgaria

Most Significant Applied Science Achievement of the Institute of Solid State Physics for 2021 "Method for determination of the ablation the threshold of solid materials" by Ognyan Ivanov, Valentin Mihailov, Stefan Karatodorov, José Luis Pérez-Díaz, based on patent 67278 B1 of the Bulgarian Patent Office

2020 **Grant from Science with Future Programme** from America for Bulgaria Foundation, Sofia, Bulgaria

2017 **Most Significant Applied Science Achievement of the Institute of Solid State Physics for 2016** "Surface photo-charge effect sensor with liquid layer for contaminations in fog", Sofia, Bulgaria

2016 **Best poster award at EWLA2016**, 13th European Workshop on Laser Ablation held in Ljubljana, Slovenia.

References

Assoc. Prof. Valentin Mihailov, PhD
Leader of Department Laser, Atomic, Molecular and Plasma Physics
Institute of Solid State Physics
Bulgarian Academy of Sciences
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New Technologies-Research Center
University of West Bohemia,
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prof. RNDr. Pavel Veis, CSc.
Department of Experimental Physics
Faculty of Mathematics, Physics and Informatics
Comenius University in Bratislava
Mlynská dolina F1, 842 48 Bratislava, Slovakia
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Ing. Jaroslav Nejdl, Ph.D.
Leader of X-ray sources Group
ELI-Beamlines
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Publications

Journal Articles

1. **Karatodorov**, **S.**, Lera, R., Raclavsky, M., Lorenz, S., Chaulagain, U., & Nejdl, J. (2021). Multi-pass probing for high-sensitivity tomographic interferometry. *Scientific Reports*, *11*(1), 1–10.
2. Zymaková, A., Albrecht, M., Antipenkov, R., Špaček, A., **Karatodorov**, **S.**, Hort, O., Andreasson, J., & Uhlig, J. (2021). First experiments with a water-jet plasma x-ray source driven by the novel high-power–high-repetition rate lı allegra laser at eli beamlines. *Journal of Synchrotron Radiation*, *28*(6).
3. Vála, L., Medlín, R., Koštejn, M., **Karatodorov**, **S.**, Jandová, V., Vavruňková, V., & Křenek, T. (2019). Laser-induced reactive deposition of nanostructured cos2-and co2cus4-based films with fenton catalytic properties. *European Journal of Inorganic Chemistry*, *2019*(9), 1220–1227.
4. Křenek, T., Medlín, R., **Karatodorov**, **S.**, Mihailov, V., Pola, M., & Reshak, A. (2017). Formation of metastable phases of ferrous sulfide via pulsed nd: Yag laser deposition: Experimental and theoretical study. *Journal of Alloys and Compounds*, *723*, 689–697.
5. Garasz, K., Tański, M., Kocik, M., Iordanova, E., Yankov, G., **Karatodorov**, **S.**, & Grozeva, M. (2016). The effect of process parameters in femtosecond laser micromachining. *Bulgarian Journal of Physics*, *43*(2).
6. Petrunov, V., Andreeva, L., **Karatodorov**, **S.**, Mihailov, V., Terzieva, S., Ilievska, I., Stoyanova-Ivanova, A., Tumbalev, V., & Mikli, V. (2015). Analysis of elemental composition of a heat activated, multi-force, nickel titanium othodontic archwire. *Bulgarian Chemical Communications*, *47*(1), 229–233.
7. **Karatodorov**, **S.**, Mihailov, V., & Grozeva, M. (2014). Emission characteristics of laser ablation-hollow cathode glow discharge spectral source. *Open Chemistry*, *1*.
8. Atanassova, V., **Karatodorov**, **S.**, Yankov, G., Zahariev, P., & Tsvetkova, E. (2013). Laser-induced fluorescence spectroscopy-a contemporary approach to cultural heritage. *Advances in Bulgarian Science*.
9. Mihailova, D., van Dijk, J., Hagelaar, G., **Karatodorov**, **S.**, Zahariev, P., Grozeva, M., & van der Mullen, J. (2012). Geometrical features in longitudinal sputtering hollow cathode discharges for laser applications. *Journal of Physics D: Applied Physics*, *45*(16), 165201.