Kamil Serafin

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Research experience

2019–2023 **Postdoctoral fellowship**, Institute of Modern Physics, Chinese Academy of Sciences, Lanzhou, China

Education

2015–2019 **PhD** in theoretical physics, University of Warsaw, Warsaw, Poland,
from 10/2015 to 09/2019,
thesis: *Bound states of heavy quarks in renormalization group procedure for QCD*,
advisor: prof. Stanisław Głazek.

2012–2014 **Master of Science** in theoretical physics, University of Warsaw, Warsaw, Poland,
from 10/2012 to 09/2014,
thesis: *Model of renormalization of masses and coupling constants*,
advisor: prof. Stanisław Głazek.

2009–2012 **Bachelor of Science** in physics, individual studies in physics, University of Warsaw,
from 10/2009 to 09/2012,
thesis: *Relativistic kinematics of a rotor.*
advisor: prof. Stanisław Głazek.

Awards

2018 Gary McCartor Award granted by The International Light Cone Advisory Committee. (link to ILCAC Press Release)

2010 The first prize in competition *Konfrontacje eksperymentalne* (Experimental confrontations), organized at the Symposium of the Institute of Experimental Physics, Faculty of Physics, University of Warsaw for the best measurement of the mass of an object hanging from a spring in a sealed container, see Eur. J. Phys. **33**, 129 (2012).

2009 Laureate title in LVIII Polish National Physics Olympiad, Warsaw.

Programming

- Python
- FORTRAN
- MPI

Publications

- K. Serafin, M. Gómez-Rocha, J. More, S. D. Głazek, *Dynamics of heavy quarks in the Fock space*, arXiv:2310.00365
- Z. Kuang, K. Serafin, X. Zhao, J. P. Vary, *All-charm tetraquark in front form dynamics*, Phys. Rev. **D105**, 094028 (2022) arXiv:2201.06428
- K. Serafin, M. Gómez-Rocha, J. More, S. D. Głazek, *Approximate Hamiltonian for baryons in heavy-flavor QCD*, Eur. Phys. J. **C78**, 964 (2018) arXiv:1805.03436
- S. M. Dawid, R. Gonsior, J. Kwapisz, K. Serafin, M. Tobolski, S. D. Głazek, *Renormalization group procedure for potential $-g/r^2$*, Phys. Lett. **B777**, 260 (2018), arXiv:1704.08206
- S. D. Głazek, M. Gómez-Rocha, J. More, K. Serafin, *Renormalized quark–antiquark Hamiltonian induced by a gluon mass ansatz in heavy-flavor QCD*, Phys. Lett. **B773**, 172 (2017) arXiv:1705.07629
- K. Serafin, S. D. Głazek, *Elementary example of energy and momentum of an extended physical system in special relativity*, Am. J. Phys. **85**, 529 (2017) arXiv:1705.07106
- K. Serafin, J. Oracz, M. Grzybowski, M. Koperski, P. Sznajder, Ł. Zinkiewicz and P. Wasylczyk, *Measurement of the mass of an object hanging from a spring–revisited*, Eur. J. Phys. **33**, 129 (2012)

Conference proceedings

- Kamil Serafin, *Form factors and structure functions of heavy mesons and baryons*, PoS LC2019 079 (2020),
- M. Gómez-Rocha, Kamil Serafin, *Effective-particle approach to bound states of quarks and gluons in QCD*, PoS Hadron2017 150 (2018), arXiv:1712.08100
- K. Serafin, *Relativistic Model of Hamiltonian Renormalization for Bound States and Scattering Amplitudes*, Few-Body Syst. **58**, 125 (2017), arXiv:1705.03844

Talks and posters

2023.09 Light Cone 2023, Rio de Janeiro, Brazil,
talk *Positronium in quantum electrodynamics of effective particles.*

2023.05 Hamiltonian Field Theory for QCD and Hadron Physics, Granada, Spain,
talk *QCD Hamiltonian without divergences.*

2022.09 Light Cone 2022, Online,
talk *Basis-function approach to Quantum Chromodynamics of effective quarks.*

2021.11 Light Cone 2021, Jeju Island, South Korea (online attendance),
talk *All-charm tetraquark using BLFQ.*

2021.01 The 5th Symposium on Hadron Spectrum and Hadron Structure, Sun Yat-sen University, Guangzhou, China (online),
talk *Relativistic description of heavy hadrons in QCD using renormalization group procedure for effective particles and basis light-front quantization.*

2019.09 Light Cone 2019, Ecole Polytechnique, Palaiseau, France,
talk *Form factors and structure functions of heavy mesons and baryons.*

2019.02 "Frontiers in Nuclear and Hadronic Physics 2019" school, Florence, Italy,
talk *QCD of effective particles.*

2018.09 Emergent mass and its consequences in the Standard Model, ECT*, Trento, Italy,
talk *Gluon-mass-induced triply heavy baryon masses.*

2018.05 Light Cone 2018, Jefferson Laboratory, Newport News, USA,
talk *Approximate three-quark Hamiltonian in heavy flavor QCD.*

2017.09 Hadron 2017, Salamanca, Spain,
poster *Effective quarks and gluons in heavy-flavor QCD.*

2017.07 The Charm and Beauty of Strong Interactions, ECT*, Trento, Italy,
talk *Harmonic oscillator force in heavy quarkonia.*

2017.02 "Bound States and Resonances" school, Admont, Austria,
poster *Effective interactions between heavy quarks.*

2016.09 Light Cone 2016, Lisbon, Portugal,
talk *Relativistic Yukawa model of Hamiltonian renormalization for bound states and scattering amplitudes.*

2015.03 Bound states in QCD and beyond, St. Goar, Germany,
poster *Relativistic description of bound states and scattering amplitudes in Hamiltonian dynamics.*

Seminars

2021.05 "Theoretical Physics Seminar", Jagiellonian University, Cracow, Poland (online),
,,On the description of heavy mesons using QCD of effective particles and Light Front basis approach."

2019.01 "Exact Results in Quantum Theory & Gravity", University of Warsaw, Poland,
,,Off-shell Coulomb potential from QED."

2018.03 Cracow-Warsaw PhD Students' Symposium, Jagiellonian University, Cracow, Poland,
Effective Hamiltonians for hadrons induced by a gluon mass ansatz in QCD.

2018.03 "Exact Results in Quantum Theory & Gravity", University of Warsaw, Poland,
,,Renormalization of $1/r^2$ *potential."*

2017.12 XII Symposium of the Institute of Theoretical Physics, Faculty of Physics, University of Warsaw, Poland,
Renormalized quark Hamiltonian induced by a gluon mass ansatz in QCD.

2012.11 Theory of Relativity Seminar, University of Warsaw, Poland,
,,Relativistic kinematics of a rotor."

Schools

2022.02 "Frontiers in Nuclear and Hadronic Physics 2022" school, Florence, Italy (online attendance).

2019.02 "Frontiers in Nuclear and Hadronic Physics 2019" school, Florence, Italy,
talk *QCD of effective particles.*

2017.02 "Bound States and Resonances" school, Admont, Austria,
poster *Effective interactions between heavy quarks.*

Teaching classes

2017 Mathematics III

2016 Mechanics and special theory of relativity

2016 Analysis

2015 Introduction to renormalization

2015 Mathematics I

Academic service

2016–2018 Member of Science Council of Institute of Theoretical Physics, Faculty of Physics, University of Warsaw

2016 Member of PhD students' Council at Faculty of Physics, University of Warsaw

Students club

2017–2019 President of Students Club of Physics in University of Warsaw (SKFiz).
http://skfiz.fuw.edu.pl

2011/2012 Vice-president of Students Club of Physics in University of Warsaw.

2010–2019 Member of Students Club of Physics in University of Warsaw.

Hobbies

- Shogi
- Climbing
- Guitar