


Scientific profile structure (portfolio) of potential research supervisor as participant of the International Olympiad in the Association "Global universities" on the postgraduate studies track in 2021-2022.

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| University | Samara National Research University |
| English proficiency | Intermediate |
| The direction of training for which the graduate student will be accepted | Theoretical Physics |
| The code of the field of study for which the graduate student will be accepted | 1.3.3 |
| List of research projects of a potential supervisor | <ol style="list-style-type: none"> 1. Quantum chromodynamics at high energies - the parton Reggeization approach, supervisor 2. Study of the quark-gluon structure of hadrons in the SPD NICA experiment: theory and modeling, supervisor |
| List of possible research topics | <ol style="list-style-type: none"> 1. Quantum chromodynamics at high energies and hard processes in the parton Reggeization approach. 2. Hard processes in the TMD factorization approach at energies of the NICA collider |
|  <p>Research supervisor: Vladimr A. Saleev, Doctor of Science (Institute for Nuclear Physics, Moscow State University, 1997)</p> | <p style="text-align: center;">Hard processes in quantum chromodynamics: theory-phenomenology-experiment</p> <p>Supervisor's research interests:</p> <ol style="list-style-type: none"> 1. Quantum chromodynamics at high energies in the parton Reggeization approach based on Lipatov's effective action and factorization at high energies. Phenomenology of hard processes at LHC energies, description of multiscale observables, non-integrated parton distributions. 2. Description of the hard processes in the transverse momentum-dependent factorization (TMD-factorization) approach at energies of the NICA collider. Modeling hard processes for studying the quark-gluon structure of hadrons and the nature of hadron spin |
| | <p>Research highlights:</p> <ol style="list-style-type: none"> 1. Research in the field of quantum chromodynamics and high-energy physics is carried out in cooperation with the 2nd Institute for Theoretical Physics of the University of Hamburg (the group of Prof. B.A. Kniehl), the cluster of the laboratory of the phenomenology of elementary particles is used for calculations, training in Hamburg University by the grants of German Academic Exchange Service (DAAD) is possible. 2. Investigations of the quark-gluon structure of hadrons and the nature of hadron spin within the SPD NICA experiment are carried out jointly with the Joint Institute for Nuclear Research (JINR, Dubna). Theory - in cooperation with the laboratory of theoretical physics, and modeling of processes at NICA energies - in cooperation with the laboratory of nuclear problems of JINR. Postgraduate students have the opportunity to work on the JINR computing clusters, to undergo training in the JINR laboratories. 3. Financial support is provided for graduate students within the framework of ongoing projects at Samara University, as well as various grant programs. |

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| | <p>Supervisor's specific requirements:</p> <ul style="list-style-type: none"> ● Basic course of quantum mechanics, including relativistic ● Basic course of quantum field theory, skills in calculation of amplitudes in formalism of Feynman diagrams ● Parton model and quantum chromodynamics ● LINUX, FORTRAN, C++, Mathematica ● <p>Supervisor's main publications</p> <ul style="list-style-type: none"> ● Zhi-Guo He, B.A. Kniehl, M.A. Nefedov, V.A. Saleev. Double Prompt J/ψ Hadroproduction in the Parton Reggeization Approach with High-Energy Resummation // Physical Review Letters 2019. – Vol. 123. –N 16. – P.162002 ● M.A. Nefedov, V.A. Saleev Off-shell initial state effects, gauge invariance and angular distributions in the Drell–Yan process// Phys. Lett. B. 2019 – Vol. 790. – P. 551-556. ● A.V. Karpishkov, M.A. Nefedov and V.A. Saleev, BB angular correlations at the LHC in parton Reggeization approach merged with higher-order matrix elements, Phys. Rev. D 96(9), 096019 (2017). ● A. V. Karpishkov, M. A. Nefedov, V. A. Saleev. Evidence in favor of single parton scattering mechanism in Υ and D associated production at the LHC// Phys.Rev. D 2019. – Vol. 99 Issue 9. – P. 096021. ● V.A. Saleev, M.A. Nefedov. On the one-loop calculations with Reggeized quarks // Mod. Phys. Lett. A, 32 (2017) 1750207. |
| | <p>Results of intellectual activity:</p> <p>In the works of 2010-2020, the parton Reggeization approach was proposed and developed, based on the effective action in QCD at high energies in multi-Regge kinematics (the effective action was proposed by L.N. Lipatov in 1995). The approach makes it possible to successfully describe multiscale hard processes at high energies outside the calculations in a fixed order of the QCD perturbation theory. At present, work is underway to develop the parton Reggeization approach for calculations with the next leading approximation in the strong interaction constant.</p> |