Few-Body Systems Group (SD TAN Sector 3) at BLTP, JINR

2016 Annual Activity Report

Contents

1 Staff of the BLTP SD TAN Sector 3 in 2016

1. Andrey A. Bulychev, Dr., Junior Researcher
2. Ilyaz S. Ishmukhamedov, M.Sc., Junior Researcher
3. Sabit S. Kamalov, Dr., Senior Researcher
4. Elena A. Kolganova, Dr., Senior Researcher
5. Paulina Jaluvkova, M.Sc., Junior Researcher
6. Daniyar Janseitov, M.Sc., Junior Researcher
7. Vladimir N. Kondratyev, Dr., Senior Researcher
8. Anastasia V. Malykh, Dr., Researcher
9. Vladimir S. Melezhik, Dr. Sc., Leading Researcher
10. Alexander K. Motovilov, Dr.Sc., Head of Sector
11. Yury V. Popov, Dr., Senior Researcher (part-time)
12. Vasily V. Pupyshev, Dr.Sc., Leading Researcher
13. Evgeni A. Solov'ev, Dr.Sc., Leading Researcher
14. Dinara S. Valiolda, M.Sc., Junior Researcher
15. Sergue I. Vinitsky, Dr.Sc., Leading Researcher

Olga P. Klimenko (Ph.D. Student, since November 2014)

Artem A. Korobitsin (Ph.D. Student, since November 2012)

Evgeny A. Koval (Ph.D. Student, since November 2013)

Oksana A. Koval (Ph.D. Student, since November 2013)

2 Main results

Theoretical analysis of laser-assisted electron impact ionization of a hydrogen molecular ion H_2^+ at high impact energy and large momentum transfer is carried out [BK]. The laser-field effects on the incoming and outgoing electrons are taken into account using the Volkov functions. The field-dressing of the target electron is treated with a quasistatic state approach. Calculations for laser radiation with frequency $\omega = 1.55$ eV and intensity $I = 5 \times 10^{11}$ W/cm^2 exhibit strong laser influence on the molecular bond oscillation in laser-assisted electron momentum distributions.

[BK] A.A. Bulychev and K.A. Kouzakov, "Electron momentum spectroscopy of H_2^+ in the presence of laser radiation", *Eur. Phys. J. D* (accepted for publication).

The Efimov effect in heteronuclear cold atomic systems is studied [K1]. The results for binding energies of ^{6}Li He_2 and ^{7}Li He_2 systems are obtained using Faddeev equations in configuration space. It is shown that the exited states in both the systems are of the Efimov type.

[K1] E. A. Kolganova, "Weakly bound Li He_2 molecules", arXiv:1612.03820.

Gamma ray fluence for $^{44}Sc^*$ lines with energies 67.9 keV and 78.4 keV and the amount initially synthesized ^{44}Ti. isotope are determined Significant enhancement of ^{44}Ti yield for Type II supernovae is attributed to magnetic effects [KV].

[KV] V. N. Kondratyev, "Nuclear magics at explosive magnetization", *Eur. Phys. J: Web. of Conf.* ***117****, 09007 (2016) [5 pages]*.

A three-body system consisting of two identical fermions of mass m and a distinct particle of mass m_1, with zero-range interactions between different particles, has been studied in the universal limit of low energies in [MAV1]. It is shown that for an unambiguous definition of the (Hermitian) three-body Hamiltonian in the interval $8.619 < m/m_1 \leq 13.607$ one needs to introduce an additional parameter constraining the wave function near the triple-collision point. The dependence of the three-body bound-state energies on m/m_1 and the three-body parameter for the most important case $L^P = 1^-$ was calculated and analysed with the aid of a simple model. The same problem for different L^P has been discussed in [MAV2] The states of odd L and P for two identical fermions and states of even L and P for two identical bosons were considered. It is established that an additional three-body parameter is needed for definition of the (Hermitian) three-body Hamiltonian for m/m_1 above a critical value specific for each L^P sector.

[MAV1] O.I. Kartavtsev and A.V. Malykh, "Universal description of three two-component fermions", *Europhys. Lett.* **115**, 36005, (2016).

[MAV2] O.I. Kartavtsev and A.V. Malykh, "Universal description of three two-component fermions", Proc. of the 4th South Africa–JINR Symposium "Few to Many Body Systems: Models, Methods and Applications", JINR, Dubna, 2016. P. 23–29.

Geometric (confinement-induced) resonances were predicted in atom-ion systems, dependence of positions of these resonances on the atomic mass and the colliding energy was calculated, analytic and semi-analytic formulae for the position of a geometric resonance were obtained in the "long-wavelength and zero-energy limit" [MN]. Furthermore, it was found that a slight anisotropy of the confining trap considerably enhances the reactive rate constants in the scattering of cold atoms [SSM].

[MN] V. S. Melezhik and A. Negretti, "Confinement-induced resonances in ultracold atom-ion systems", *Phys. Rev. A* ***94****, 022704 (2016) [8 pages].*

[SSM] S. Shadmehri, V. S. Melezhik, and S. Saeidian, "Multichannel scattering and loss processes of ultracold atoms in anisotropic harmonic waveguides", *Phys. Rev. A* ***93****, 063616 (2016) [9 pages].*

Assume that the Hamiltonian H reads as a J-self-adjoint 2×2 block-operator matrix. The work [AM] establishes conditions ensuring the analytic continuability of one of the Schur complements of the operator 2×2-matrix $H-E$ to the unphysical sheets of the energy E plane. Theorems on factorization of the continued complement in the sense of Markus and Matsaev are prooven. In the Feshbach spectral case, it is established that the operator root of the Schur complement analytically continued to the respective unphysical sheet, generates for H a pair of J-orthogonal invariant subspaces.

[AM] S. Albeverio and A. K. Motovilov, "On invariant graph subspaces of a J-self-adjoint operator in the Feshbach case", *Math. Notes* ***100****, 761–773 (2016)*.

The correct calculations of angular differential cross sections were performed for the process of a direct single electron ionization of helium atom by fast 1 MeV proton. The theoretical results were convoluted with the experimental resolution. Good agreement of the theory and experiment was obtained for the first time including the domain of perpendicular electron scattering [CBP].

[CBP] H. Gassert, O. Chuluunbaatar, M. Waitz, F. Trinter, H.-K. Kim, T. Bauer, A. Laucke, Ch. Muller, J. Voigtsberger, M. Weller, J. Rist, M. Pitzer, S. Zeller, T. Jahnke, L. Ph. H. Schmidt, J.B. Williams, S. A. Zaytsev, A. A. Bulychev, K.A. Kouzakov, H. Schmidt-Bocking, R. Dorner, Y.V. Popov, and S. Schoffler, "Agreement of experiment and theory on the single ionization of helium by fast proton impact", *Phys. Rev. Lett.* ***116****, 073201 (2016)*.

In [VP1], a new approach (the "method of amplitude functions") is formulated and approved for solving the radial problem of two-dimensional scattering of a quantum particle by the sum of the Coulomb potential and a central short- or long-range potential. In [VP2] the suggested method is applied to the two-dimensional scattering of a slow quantum particle. The analysis of low-energy asymptotics of all radial wave-functions, partial phase-shifts and cross-sections is given. Two methods for calculation of the scattering length and effective radius are proposed.

[VP1] V. V. Pupyshev, "The amplitude functions method in the theory of two-dimensional scattering", *JINR Preprint P4-2016-50, Dubna, 2016* (accepted for publication in *Theor. Math. Phys.*)

[VP2] V. V. Pupyshev, "Two-dimensional nuclear-Coulomb scattering of a slow quantum particle", *JINR Preprint P4-2016-58, Dubna, 2016* (accepted for publication in *Theor. Math. Phys.*).

The paper [SV] discusses a method for solving the problem of quantum tunneling through repulsive potential barriers for a composite system consisting of several identical particles coupled via pair oscillator-type potentials in the oscillator symmetrized-coordinate representation. The study [SV] confirms the efficiency of the proposed approach by calculating complex energy values and analyzing metastable states of composite systems of three, four, and five identical particles on a line, which leads to the effect of quantum transparency of the repulsive barriers.

[SV] A. A. Gusev, S. I. Vinitsky, O. Chuluunbaatar, V. L. Derbov, A. Góźdź, and P. M. Krassovitskiy, "Metastable states of a composite system tunneling through repulsive barriers", *Theor. Math. Phys.* ***186****, 21–40 (2016).*

3 Publications

3.1 Books

1. *Symmetry in Integrable Systems and Nuclear Physics*: Book of Lectures of Humboldt Kolleg/ The Third International School (Tsakhadzor, Armenia, July 3–13, 2013) /Eds.: G.S Pogosyan, E.A. Kolganova, S.I.Vinitsky.– Dubna: JINR, 2016. – 155 pp. ISBN 978-5-9530-0444-2.

3.2 Journal publications

1. S. Albeverio and A. K. Motovilov, "On invariant graph subspaces of a J-self-adjoint operator in the Feshbach case", *Math. Notes* ***100****, 761–773 (2016)*.

2. V.B. Belyaev, M.B. Miller, J. Otto, and S.A. Rakityansky, "Nuclear fusion induced by x rays in a crystal", *Phys. Rev. C* ***93****, 034622 (2016).*

3. N. Burtebayev, S. K. Sakhiev, D. M. Janseitov, Zh. K. Kerimkulov, D. K. Alimov, and A.N. Danilov. "Investigation of the elastic and inelastic scattering of alpha-particles from ^{13}C in the energy range 26.6–65 MeV", *International Journal of Modern Physics E* ***26****, No 10 (1650078) (2016)*.

4. A. S. Demyanova, A. A. Ogloblin, A. A. Danilov, S. A. Goncharov, T. L. Belyaeva, Y.G. Sobolev, S. A. Khlebnikov, N. Burtebaev, W. Trzaska, P. Heikkinen, G. P. Tyurin, D. Janseitov, and Y. B. Gurov, "States of ^{13}C with abnormal radii", *Eur. Phys. J: Web of Conf.* ***117****, (04012) (2016)*.

5. N. Burtebayev, B. A. Duisebayev, Zh. K. Kerimkulov, Y. S. Mukhamejanov, D. K. Alimov, D. M. Janseitov, N. O. Saduev, N. V. Gluschenko, S. B. Sakuta, R. J. Peterson, and L. I. Galanina, "Analysis of elastic and inelastic scattering of alpha particle sand ^{3}He ions from ^{9}Be, ^{13}C nuclei and deuterons from ^{11}B nuclei at low energies", *News of the National Academy of Sciences of the Republic of Kazakhstan* ***01(305)****, 66–74 (2016)*.

6. N. Burtebayev, Zh. K. Kerimkulov, A. S. Demyanova, A. A. Danilov, D. M. Janseitov, T. K. Zholdybayev, D. K. Alimov "Investigation of elastic scattering of ^{3}He ions from ^{13}C nuclei at 50 and 60 MeV in optical and folding models", *News of the National Academy of Sciences of the Republic of Kazakhstan* ***02(306)****, 55–61 (2016)*.

7. A. Galstyan, O. Chuluunbaatar, A. Hamido, Y. V. Popov, F. Mota-Furtado, P. F. O'Mahony, N. Janssens, F. Catoire, and B. Piraux, "Reformulation of the strong-field approximation for light-matter interactions", *Phys. Rev. A* ***93****, 023422(1)– 023422(14) (2016).*.

8. A. Galstyan, O. Chuluunbaatar, A. Hamido, Y. V. Popov, F. Mota-Furtado, P. F. O'Mahony, N. Janssens, F. Catoire, and B. Piraux, "Erratum: Reformulation of the strong-field approximation for light-matter interactions [Phys. Rev. A 93, 023422 (2016)]", *Phys. Rev. A* ***94****, 029901(E) (2016)*.

9. H. Gassert, O. Chuluunbaatar, M. Waitz, F. Trinter, H.-K. Kim, T. Bauer, A. Laucke, Ch. Muller, J. Voigtsberger, M. Weller, J. Rist, M. Pitzer, S. Zeller, T. Jahnke, L. Ph. H. Schmidt, J.B. Williams, S. A. Zaytsev, A. A. Bulychev, K.A. Kouzakov, H. Schmidt-Bocking, R. Dorner, Y. V. Popov, and S. Schoffler, "Agreement of Experiment and Theory on the Single Ionization of Helium by Fast Proton Impact", *Phys. Rev. Lett.* ***116****, 073201 (2016)*.

10. A. A. Gusev, S. I. Vinitsky, O. Chuluunbaatar, V. L. Derbov, A. Góźdź, and P. M. Krassovitskiy, "Metastable states of a composite system tunneling through repulsive barriers", *Theor. Math. Phys.* ***186****, 21-40 (2016).*

11. A.A. Gusev, V.P. Gerdt, L.L. Hai, V.L. Derbov, S.I. Vinitsky, and O. Chuluunbaatar, "Symbolic-numeric algorithms for solving BVPs for a system of ODEs of the second order: multichannel scattering and eigenvalue problem", *Lecture Notes in Computer Science* ***9890****, 212–227 (2016).*

12. A. A. Gusev, V. P. Gerdt, S. I. Vinitsky, V. L. Derbov, A. Góźdź, A. Pedrak, A. Szulerecka, and A. Dobrowolski, "Symbolic Algorithm for Generating Irreducible Rotational-Vibrational Bases of Point Groups", *Lecture Notes in Computer Science* ***9890****, 228–242 (2016).*

13. A.A.Gusev, O.Chuluunbaatar, S.I. Vinitsky, and V.L. Derbov, "Solution of the boundary-value problem for a systems of ODEs of large dimension: benchmark calculations in the framework of Kantorovich method", *Bulletin of Peoples' Friendship University of Russia. Series "Mathematics. Information Sciences. Physics"* ***3****, 31–37 (2016) .*

14. A.A. Gusev, L.L. Hai, O. Chuluunbaatar, S.I. Vinitsky, and V.L. Derbov, "Solution of boundary-value problems using Kantorovich method", *EPJ Web of Conferences. 108 (2016) p. 02026-1-6.*

15. A.A.Gusev, O.Chuluunbaatar, S.I. Vinitsky, L.L. Hai, V.L. Derbov, and A. Góźdź, "Algorithms and programs for solving boundary-value problems for systems of second-order odes with piecewise constant potentials: multichannel scattering and eigenvalue problems", *Bulletin of Peoples' Friendship University of Russia. Series "Mathematics. Information Sciences. Physics"* ***3****, 38–52 (2016).*

16. A. A. Gusev, O. Chuluunbaatar, S. I. Vinitsky, and V. L. Derbov, "Algorithms for solving the boundary-value problems for atomic trimers in collinear configuration using the Kantorovich method", *RUDN Journal of Mathematics, Information Sciences and Physics* ***4****, 56–76 (2016).*

17. O.I. Kartavtsev and A.V. Malykh, "Universal description of three two-component fermions", *Europhys. Lett.* ***115****, 36005, (2016)*.

18. V. N. Kondratyev, “Magic nuclei at explosive dynamo activity”, *Eur. Phys. J: Web of Conf.* ***107****, 10006 (2016) [3 pages]*.

19. V. N. Kondratyev, “Nuclear magics at explosive magnetization”, *Eur. Phys. J: Web of Conf.* ***117****, 09007 (2016) [5 pages]*.

20. V. N. Kondratyev and Y. V. Korovina, “Statistics of magnetar crusts magnetoemission”, *Eur. Phys. J: Web of Conf.* ***117****, 09014 (2016) [4 pages]*

21. V. N. Kondratyev and Y. V. Korovina, “Universality in magnetoemission of compact astrophysical objects”, *Odessa Astronomical Publications* ***29****, 161–162 (2016)*.

22. V. N. Kondratyev, and T. V. Mishenina, “Nucleosynthesis at magnetorotational supernova explosion and galactic chemical evolution”, *Odessa Astronomical Publications* ***29****, 157-160 (2016)*.

23. I. V. Kres, V. N. Kondratyev, S. Cherubini, and C. Spitaleri, “Preliminary studies for three experiments at Treiman-Yang criterion”, *Eur. Phys. J: Web of Conf.* ***117****, 09015 (2016) [5 pages]*.

24. V. S. Melezhik and A. Negretti, “Confinement-induced resonances in ultracold atom-ion systems”, *Phys. Rev. A* ***94****, 022704–1–8 (2016).*

25. V. S. Melezhik, “Mathematical modeling of ultracold few-body processes in atomic traps”, *EPJ Web of Conferences* ***108****, 01008–1–9 (2016).*

26. V. S. Melezhik, “Adiabatic representation in the Coulomb three-body problem in the united-atom limit: nuclear widths of the energy levels of the muonic molecule $tt\mu$”, *Theor. Math. Phys.* ***186****, 61–69 (2016).*.

27. A. K. Motovilov, “Alternative proof of the a priori $\tan\Theta$ Theorem”, *Theor. Math. Phys.* ***186****, 83–92 (2016)*.

28. Y. V. Popov, K. A. Kouzakov, A. A. Bulychev, and S. I. Vinitsky, “Theory of quasielastic atomic reactions in the presence of an alternating electric field”, *Theor. Math. Phys.* ***186****, 93–100 (2016)*.

29. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The wave functions and Green functions”, *Theor. Math. Phys.* ***186****, 213–230 (2016)*.

30. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: The structure of radial wave functions”, *Theor. Math. Phys.* ***186****, 101–117 (2016)*.

31. V. V. Pupyshev, “Two-dimensional Coulomb scattering of a quantum particle: Low-energy asymptotic behavior”, *Theor. Math. Phys.* ***188****, 1006–1029 (2016)*.

32. S. Shadmehri, V. S. Melezhik, and S. Saeidian, “Multichannel scattering and loss processes of ultracold atoms in anisotropic harmonic waveguides”, *Phys. Rev. A* ***93****, 063616–1–9 (2016).*

33. S. Vinitsky, A. A. Gusev, O. Chuluunbaatar, V. L. Derbov, and A. S. Zotkina, “On calculations of two-electron atoms in spheroidal coordinates mapping on hypersphere ”, *Proceedings of SPIE* ***9917****, 99172Z (2016).*

3.3 Articles in paper collections/conference proceedings

1. S. Albeverio and A. K. Motovilov, "Bounds on variation of the spectrum and spectral subspaces of a few-body Hamiltonian", *Proc. of Int. Conf. "Nuclear Theory in the Supercomputing Era – 2014" (NTSE-2014) / Eds. A. M. Shirokov and A. I. Mazur. Pacific National University, Khabarovsk, 2016, pp. 98–106*.

2. O.I. Kartavtsev and A.V. Malykh, "Universal description of three two-component fermions" *Proc. of the 4th South Africa–JINR Symposium "Few to Many Body Systems: Models, Methods and Applications", JINR, Dubna, 2016. P. 23–29.*

3.4 Articles accepted for publication

1. A.A. Bulychev and K.A. Kouzakov, "Electron momentum spectroscopy of H_2^+ in the presence of laser radiation", *Eur. Phys. J. D* (accepted for publication).

2. N. Burtebayev, Zh. K. Kerimkulov, A. S. Demyanova,S. B. Sakuta, A. K. Morzabayev, Y. S. Muk ha me janov, D. M. Janseitov, M. Nassurlla, "Investigation of α-particle scattering from ^{13}C at energy 29 MeV", *Journal of Physics: Conference Series* (accepted for publication).

3. N. Burtebayev, Zh. K. Kerimkulov, Y. S. Mukhamejanov, D. M. Janseitov, M. Nassurlla, "Stu dy of elastic and inelastic scattering of α-particles from ^{11}B nuclei in the energy range of 29-54 MeV", *Journal of Physics: Conference Series* (accepted for publication).

4. A. Galstyan., Y.V. Popov , F. Mota-Furtado, P.F. O'Mahony, N. Janssens, S.D. Jenkins, O. Chuluunbaatar, B. Piraux, "Modelling laser-atom interactions in the strong field regime", *Eur. Phys. J. D* (accepted for publication).

5. E. A. Kolganova, "Efimov states in three-body atomic clusters", *PEPAN* (accepted for publication).

6. E. A. Kolganova, A. K. Motovilov, and W. Sandhas, "The ^{4}He trimer as an Efimov system: Latest developments", *Few-Body Systems* (accepted for publication).

7. V. N. Kondratyev and Y. V. Korovina, "Magnetoemission of magnetar crust", *Phys. Atom. Nucl.* (accepted for publication).

8. A. A. Korobitsin, E. A. Kolganova, O. P. Klimenko, and W. Sandhas, "Three-atomic clusters of rare gases within Faddeev approach", *Phys. Atom. Nucl.* (accepted for publication).

9. A. A. Korobitsin and E. A. Kolganova, "The rare gas clusters", *Izvestiya RAN* (accepted for publication).

10. A. A. Korobitsin and E. A. Kolganova, "Neon trimer in the framework of Faddeev differential equations", *PEPAN Letters* (accepted for publication).

11. Y.V. Popov, A. Galstyan, F. Mota-Furtado, P.F. O'Mahony, B. Piraux, "The strong field approximation within a Faddeev-like formalism for laser-metter interactions", *Eur. Phys. J. D* (accepted for publication).

12. V. V. Pupyshev, "The amplitude functions method in the theory of two-dimensional scattering", *Theor. Math. Phys.* (accepted for publication).

13. V. V. Pupyshev, "Two-dimensional nuclear-Coulomb scattering of a slow quantum particle", *Theor. Math. Phys.* (accepted for publication).

3.5 Preprints and data bases

1. E. A. Kolganova, "Weakly bound Li He_2 molecules", arXiv:1612.03820.

2. V. V. Pupyshev, "Coulomb scattering of a slow quantum particle in a space of arbitrary dimension", *JINR Preprint P4-2016-83, Dubna, 2016.*

4 Conference and seminar presentations

4.1 Conference presentations

1. A.A. Bulychev and K.A. Kouzakov, "Theory of laser-assisted $(e,2e)$ and $(e,3e)$ scattering on helium at large momentum transfer", *The International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS 2016) (August 23–26, 2016, Lomonosov Moscow State University, Moscow, Russia)*, invited talk.

2. A.A. Bulychev and K.A. Kouzakov, "Theoretical study of laser-assisted $(e,2e)$ collisions on He and H_2^+ at large momentum transfer", *12th European Conference on Atoms, Molecules, and Photons* (September 5 – 9, 2016, Frankfurt, Germany), poster presentation.

3. N. Burtebayev, D. M. Janseitov, Zh. Kerimkulov, A. S. Demyanova, and D. Alimov, "Investigation of elastic scattering of ^{3}He ions and alpha-particles from ^{13}C in optical and folding models", *V Annual Conference of Young Scientists and Specialists* (June 6–12, 2016, Alushta, Russia), oral presentation

4. N. Burtebayev,D. M. Janseitov, Zh. Kerimkulov, and A. S. Demyanova, "Investigation of exotic states of ^{13}C", *The XX International Scientific Conference of Young Scientists and Specialists* (March 14–18, 2016, Dubna, Russia), poster presentation.

5. A. A. Gusev, O. Chuluunbaatar, S. I. Vinitsky, L. L. Hai, V. L. Derbov, Symbolic-Numerical Algorithm for Solving the Sturm – Liouville Problem at Large Values of Parameter, *International Conference "Computer Algebra"* (June 29–July 2, 2016, Moscow, Russia), section talk.

6. A. A. Gusev, O. Chuluunbaatar, S. I. Vinitsky, L. L. Hai, V. L. Derbov, Algorithms for Solving Boundary Value Problems for a System of Second-Order ODEs with Piecewise Constant Potentials, *International Conference "Computer Algebra"* (June 29–July 2, 2016, Moscow, Russia), section talk.

7. A.A. Gusev , O. Chuluunbaatar , S. Vinitsky et al, Asymptotic Form of Parametric Basis Functions for the Model of Quantum Tunnelling of Diatomic Molecules, *Distributed Computer and Communication Networks: Control, Computation, Communications (DCCN–2016)* (21–25 November, 2016, Moscow, Russia), section talk.

8. I. S. Ishmukhamedov and V. S. Melezhik, "Two atomic tunneling dynamics in a waveguide-like trap", *The International Workshop on Few-Body Systems (FBS-Dubna-2016)* (4 – 7 July 2016, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna, Russia), section talk.

9. P. Jaluvkova and E. Kopteva, "The solution for the black hole on the cosmological background", *21st International Conference on General Relativity and Gravitation* (July 10–15, 2016, New York, USA), poster.

10. O.I. Kartavtsev and A.V. Malykh , "One-dimensional three-body problem with inverse-square two-body interaction", *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4–7, 2016, Dubna, Russia), oral presentation.

11. O. P. Klimenko and E. A. Kolganova, "Rare gases clusters at ultra-low energies", *WE-Heraeus Seminar "Few-body physics: Advances and prospects in Theory and Experiment"* (April 18–20, 2016, Bad Honnef, Germany), poster presentation

12. E. A. Kolganova, "Efimov states in three-body atomic clusters', *The International Session-Conference of SNP PSD RAS "Physics of Fundamental Interactions"* (April 12 – 15, 2016, Dubna, Russia), oral presentation

13. E. A. Kolganova, "Three-atomic clusters within the framework of Faddeev equations", *WE-Heraeus Seminar "Few-body physics: Advances and prospects in Theory and Experiment"* (April 18–20, 2016), Bad Honnef, Germany, invited talk.

14. E. A. Kolganova, "Weakly bound He_2Li and He_3 molecules", *International Workshop on Few-Body Systems* (July 4–7, 2016, Dubna, Russia), oral presentation.

15. E. A. Kolganova, "Asymmetric trimers within Faddeev approach", *The 23rd European Conference on Few-Body Problems in Physics* (August 8–12, 2016, Aarhus, Denmark), oral presentation.

16. E. A. Kolganova, "Efimov states in asymmetric trimers", *The 10th APCTP-BLTP/JINR-RCNP-RIKEN Joint Workshop on Nuclear and Hadronic Physics* (August 17– 21, 2016, Wako, Japan), oral presentation.

17. V. N. Kondratyev and T. V. Mishenina, "Nucleosynthesis at magnetorotational supernova explosion and galactic chemical evolution", *Brainstorming and Fun 2016 Compact objects, their equation of state, related explosive events, and their nucleosynthesis* (September 29 – October 1, 2016, Basel, Switzerland), invited talk

18. V. N. Kondratyev, "Zeeman effect at magnetorotational explosive nucleosynthesis", *Astronomy and Space Physics in Kyiv University* (May 24–27, Kiev, Ukraine), invited section talk.

19. V. N. Kondratyev and T. V. Mishenina, "Nucleosynthesis at magnetorotational supernova explosion and galactic chemical evolution", The XVI-th Gamow Odessa Astronomical Summer Conference-School (August 14–20, 2016, Odessa, Ukraine), invited section talk.

20. V. N. Kondratyev, "Universality in SGR burst statistics", *BLTP/JINR-KLTP/CAS Joint Workshop on Physics of Strong Interaction* (June 28 – July 3, 2016, Dubna, Russia), oral presentation.

21. V. N. Kondratyev, Y.V. Korovina, and P. Blanchard, "Sensors with superferromagnets", *7th International Conference Physics of Liquid Matter: Modern Problems* (May 27 – June 3, 2016, Kiev, Ukraine), section talk.

22. V. N. Kondratyev and P. Blanchard, "Self-organized criticality at tumor growth and therapy", Workshop *"Modeling Tumor Evolution: Initiation, Growth and Progression"* (September 12–17, 2016, Bielefeld, Germany), invited talk.

23. A. A. Korobitsin and E. A. Kolganova, "Three-atomic systems in the framework of Faddeev differential equations", *The XX International Scientific Conference of Young Scientists and Specialists* (March 14–18, 2016, Dubna, Russia), oral presentation.

24. A. A. Korobitsin and E. A. Kolganova, "Three-atomic clusters of rare gases within Faddeev approach", *The V School–Conference of Young Scientists and Specialists of JINR* (June 6–12, 2016, Alushta, Russia), oral presentation.

25. E.A. Koval and O.A. Koval, "Two-dimensional (2D) Hydrogen in a tilted magnetic field", *IRTG: Ultracold few- and many-body systems* (July 24–29, 2016, Mittelwihr, France), poster presentation.

26. E.A. Koval and O.A. Koval, "Theoretical investigation of the resonance states of low-dimensional two-body system in external electric field", *The XX International Scientific Conference of Young Scientists and Specialists* (March 14–18, 2016, Dubna, Russia), oral presentation.

27. O.A. Koval and E.A. Koval , "Theoretical Investigation of 2D Hydrogen in Magnetic Field", *12th European Conference on Atoms, Molecules, and Photons* (5–9 September 2016, Frankfurt, Germany), poster presentation.

28. O.A. Koval and E.A. Koval , "Stark Effect in Two-dimensional Hydrogen: a numerical approach", *IRTG: Ultracold few- and many-body systems* (July 24–29, 2016, Mittelwihr, France), poster presentation.

29. O.A. Koval and E.A. Koval , "The 2D hydrogen atom energy spectrum dependence on the orientation of the external static magnetic field", *The XX International Scientific Conference of Young Scientists and Specialists* (March 14–18, 2016, Dubna, Russia), oral presentation.

30. V. S. Melezhik, "Confinement-induced resonances in cold atomic and atom-ion systems", *25th Annual International Laser Physics Workshop* (July 11–15, 2016, Erevan, Armenia), invited talk.

31. V. S. Melezhik, "Modeling atomic dynamics in strong elliptically polarized laser fields", *25th Annual International Laser Physics Workshop* (July 11–15, 2016, Erevan, Armenia), oral presentation.

32. V. S. Melezhik, "Confinement-induced resonances in ultracold atom-ion systems", *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4 – 7, 2016, BLTP JINR, Dubna, Russia), oral presentation.

33. V. S. Melezhik, "Quantum simulation with cold atoms: from solid state to high energy physics and cosmology", *New Trends in High Energy Physics* (October 2–8, 2016, Budva, Montenegro), section talk.

34. V. S. Melezhik, "Quantum simulation with cold atoms: from solid state to high energy physics and cosmology", *Meeting of the working group on theory of hadronic matter under extreme condition* (October 31– November 4, 2016, Dubna, Russia), oral presentation.

35. V. S. Melezhik and A. Negretti, "Confinement-induced resonances in ultracold atom-ion systems", *WE-Heraeus seminar "Ultracold Quantum Gases-Current Trends and Future Perspectives"* (May 9–13, 2016, Bad Honnef, Germany), poster.

36. A. K. Motovilov, "Eigenvectors of multichannel scattering matrices at resonance energy values", *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4–7, 2016, Dubna, Russia), oral presentation.

37. A. K. Motovilov, "Invariant graph subspaces of a J-self-adjoint operator in the Feshbach case", *Workshop on Operator Theory and Indefinite Inner Product Spaces* (December 17–20, 2016, Vienna, Austria), oral presentation.

38. A. K. Motovilov, "Structure of T-matrices on unphysical energy sheets and few-body resonances", *International Conference "Nuclear Theory in the Supercomputing Era – 2016 (NTSE-2016)"* (September 19–23, 2016, Khabarovsk, Russia), invited talk.

39. Y.V. Popov, "Dynamics of atomic hydrogen in strong low frequency laser field', *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4–7, 2016, JINR, Dubna, Russia), oral presentation.

40. V. V. Pupyshev, "Two-dimensional Coulomb scattering of a quantum particle: low-energy approximations of the wave-functions", *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4–7, 2016, JINR, Dubna, Russia), oral presentation.

41. E. A. Solov'ev, "Dynamical adiabatic theory of atomic collisions", *International Workshop on Few-Body Systems (FBS-Dubna-2016)* (July 4–7, 2016, Dubna, Russia), oral presentation.

42. E. A. Solov'ev, "The Demkov-Osherov model and the advanced adiabatic theory", *Memorial seminar dedicated to 90 years of Y.N.Demkov (1926–2010)* (April 19, 2016, St. Petersburg, Russia), oral presentation.

43. D. S. Valiolda, "The study of Coulomb breakup of the halo nuclei in quantum-mechanical approach ", *20th International Scientific Conference of Young Scientists and Specialists* (March 2016 14–18, Dubna, Russia, poster presentation.

44. D. S. Valiolda, "Theoretical investigation of Coulomb breakup of the halo nuclei ", *International Conference of Students and Young Scientists "Farabi World – 2016"* (April 13–16, 2016, Almaty, Kazakhstan), poster presentation.

45. D. S. Valiolda, “Theoretical study of Coulomb breakup of the halo nuclei of ^{11}Be ”, *The 9th International Scientific Conference ”Modern Achievements of Physics and Fundamental Physical Education”* (12–14 October 2016, Almaty, Kazakhstan), poster presentation.

46. S. Vinitsky, A.A. Gusev, O. Chuluunbaatar, V.L. Derbov, and P.M. Krassovitskiy, “Three-body scattering model: diatomic homonuclear molecule and atom in collinear configuration”, *Saratov Fall Meeting - 16, Workshop on Laser Physics and Photonics XVIII* (September 27–30, 2016 Saratov, Russia), section talk.

47. S. I. Vinitsky, “Construction of irreducible bases for rotation and vibration nuclear motions with point symmetries”, *The 6th International Conference on Contemporary Physics (ICCP-VI)* (June 07-10, 2016, Ulaanbaatar, Mongolia), oral presentation.

48. S. I. Vinitsky, “Calculating spectral and optical characteristic of quantum dots”, *4th International Symposium ”Optics and its Applications” (OPTICS-2016)* (July 25–28, 2016, Yerevan–Ashtarak, Armenia), oral presentation.

49. S. I. Vinitsky, A. A. Gusev, V. P. Gerdt, S. I. Vinitsky, V. L. Derbov, A. Góźdź, A. Pędrak, A. Szulerecka, and A. Dobrowolski, “Symbolic Algorithm for Generating Irreducible Rotational-vibrational bases of point groups”, *The 18th International Workshop on Computer Algebra in Scientific Computing* (September 19 - 23, 2016, Bucharest, Romania), oral presentation.

50. S. I. Vinitsky, “Transmission of clusters with several identical particles through barriers and wells”, *XXI Nuclear Physics Workshop Maria and Pierre Curie* (September 27– October 02, 2016, Kazimierz Dolny, Poland), poster.

51. S. Vinitsky , A. Gusev , O. Chuluunbaatar , A. Góźdź, V. Derbov, “Kantorovich and Galerkin-Type Methods for Modelling Quantum Tunneling of Composite Systems through Barriers”, *Distributed Computer and Communication Networks: Control, Computation, Communications (DCCN–2016)* (November 21–25, 2016, Moscow, Russia), section talk.

52. S. Vinitsky , A. Gusev , O. Chuluunbaatar , V. Gerdt , and V. Derbov, “Symbolic numerical algorithms and programs for the solution of boundary-value problems of dynamics of few-body quantum systems”, *Distributed Computer and Communication Networks: Control, Computation, Communications (DCCN–2016)* (November 21–25, 2016, Moscow, Russia), section talk.

53. S. Vinitsky , A. Gusev , O. Chuluunbaatar , and V. Derbov, “Benchmark calculations of the boundary-value problem for a systems of ODEs of large dimension in the framework of Kantorovich method”, *Distributed Computer and Communication Networks: Control, Computation, Communications (DCCN–2016)* (November 21–25, 2016, Moscow, Russia), section talk.

4.2 Seminar talks

1. I. S. Ishmukhamedov and V. S. Melezhik, “Tunneling of two bosonic atoms from a one-dimensional anharmonic trap” (1 November 2016, Seminar on Few-Body Systems, Bogoliubov Laboratory of Theoretical Physics, JINR, Dubna).

2. D. M. Janseitov, ”Study of the excited states of the ^{13}C nuclei” (1 June 2016, Seminar at Institute of Nuclear Physics, Almaty, Kazakhstan.

3. A.K. Motovilov, “On invariant graph subspaces of a J-self-adjoint operator in the Feshbach spectral situation” (19 February 2016, Seminar “Operator Models in Mathematical Physics”, Faculty of Mechanics and Mathematics, Moscow Lomonosov State University).

4. Y.V. Popov, “Separable potentials in the theory of ionization of atoms and molecules by alternating electric field” (26 September 2016, Seminar of the BLTP Nuclear Department, JINR, Dubna).

5. E. A. Solov’ev, “Dynamical adiabatic theory of atomic collisions” (21 September 2016, Max Planck Institute, Dresden, Germany).

6. E. A. Solov’ev, “Dynamical adiabatic theory of atomic and nuclear collisions” (13 October 2016, Institute of Theoretical Physics, Kiev, Ukraine).

7. D. S. Valiolda, “Coulomb breakup of ^{11}Be” (20 November 2016, Seminar at Faculty of Physics and Technology, Kazakh National University, Almaty, Kazakhstan).

5 Visits

5.1 Conferences, schools

1. A. A. Bulychev, “The International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS 2016)” (Lomonosov Moscow State University, Moscow, Russia) 23.08.2016–26.08.2016.

2. A. A. Bulychev, “12th European Conference on Atoms Molecules and Photons (ECAMP12)” (Goethe University Frankfurt, Frankfurt, Germany) 5.09.2016–9.09.2016.

3. P. Jaluvkova, 21st International Conference on General Relativity and Gravitation (Columbia University, New York, USA), 10.07.2016–15.07.2016.

4. D. M. Janseitov, participation in “The V annual conference of young scientists and specialists Alushta–2016” (Alushta, Russia), 06.06.2016–12.06.2016.

5. O. P. Klimenko, WE-Heraeus Seminar “Few-body physics: Advances and prospects in Theory and Experiment” (Bad Honnef, Germany), 18.04.2016–20.04.2016.

6. E. A. Kolganova, WE-Heraeus Seminar “Few-body physics: Advances and prospects in Theory and Experiment” (Bad Honnef, Germany), 18.04.2016–20.04.2016.

7. E. A. Kolganova, The 23 European Conference on Few-Body Problems in Physics (Aarhus, Denmark), 08.08.2016 – 12.08.2016.

8. E. A. Kolganova, The 10th APCTP-BLTP/JINR-RCNP-RIKEN Joint Workshop on Nuclear and Hadronic Physics (Wako, Japan), 17.08.2016–21.08.2016.

9. V.N.Kondratyev, Brainstorming and Fun 2016 Compact objects, their equation of state, related explosive events, and their nucleosynthesis (Basel, Switzerland), 29.09.2016–01.10.2016.

10. V.N.Kondratyev, International Conference “Astronomy and Space Physics in Kyiv University” (Kiev, Ukraine), 24.05.2016-27.05.2016.

11. V.N.Kondratyev, The XVI-th Gamow Odessa Astronomical Summer Conference-School (Odessa, Ukraine), 14.08.2016–20.08.2016.

12. V.N.Kondratyev, Workshop “Modelling Tumour Evolution: Initiation, Growth and Progression” (Bielefeld, Germany), 10.09.2016–18.09.2016.

13. E. A. Kolganova, SA–JINR 10th Collaboration Celebration and Ten-year Review Forum (Pretoria, South Africa), 28.11.2016–05.12.2016.

14. A. A. Korobitsin, “The V School - Conference of Young Scientists and Specialists JINR Alushta 2016” (Alushta, Russia), 06.06.2016–12.06.2016.

15. E.A. Koval, IRTG: Ultracold few- and many-body systems (Mittelwihr, France), 24.07.2016–29.07.2016.

16. E.A. Koval, 12th European Conference on Atoms Molecules and Photons (Frankfurt, Germany), 05.09.2016–09.09.2016.

17. O.A. Koval, IRTG: Ultracold few- and many-body systems (Mittelwihr, France), 24.07.2016–29.07.2016.

18. O.A. Koval, 12th European Conference on Atoms Molecules and Photons (Frankfurt, Germany), 05.09.2016–09.09.2016.

19. V. S. Melezhik, WE-Heraeus seminar “Ultracold Quantum Gases-Current Trends and Future Perspectives” (WE-Heraeus Center, Bad Honnef, Germany), 09.05.2016–13.05.2016.

20. V. S. Melezhik, 25th Annual International Laser Physics Workshop (Yerevan Physics Institute, Erevan, Arminia), 11.07.2016–15.07.2016.

21. V. S. Melezhik, New trends in high energy physics (DNPL JINR, Budva, Montenegro), 02.10.2016–08.10.2016.

22. A. K. Motovilov, Workshop on Operator Theory and Indefinite Inner Product Spaces (Vienna, Austria), 16.12.2016–21.12.2016.

23. A. K. Motovilov, International Conference “Nuclear Theory in the Supercomputing Era – 2016” (Khabarovsk, Russia), 17.09.2016–23.09.2016,

24. Y.V. Popov, International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS2016) (Moscow, Russia), 23.08.2016–26.08.2016.

25. D. S. Valiolda, International Conference of Students and Young Scientists ”Farabi World – 2016” (Almaty, Kazakhstan), 13.04.2016–16.04.2016.

26. D. S. Valiolda, The 9th International Scientific Conference ”Modern Achievements of Physics and Fundamental Physical Education” (Almaty, Kazakhstan), 12.10.2016–14.10.2016.

27. S. I. Vinitsky, The 6th International Conference on Contemporary Physics (ICCP-VI) (June 07-10, 2016, Ulaanbaatar, Mongolia) .

28. S. I. Vinitsky, 4th International Symposium "Optics and its Applications" (OPTICS-2016) (July 25-28, 2016, Yerevan–Ashtarak, Armenia) .

29. S. I. Vinitsky, The 18th International Workshop on Computer Algebra in Scientific Computing (September 19–23, 2016, Bucharest, Romania) .

30. S. I. Vinitsky, XXI Nuclear Physics Workshop Maria and Pierre Curie (September 27-October 02, 2016, Kazimierz Dolny, Poland) .

31. S. I. Vinitsky, Distributed Computer and Communication Networks: Control, Computation, Communications (DCCN–2016) (21–25 November, 2016, Moscow, Russia) .

5.2 Collaboration visits

1. I. S. Ishmukhamedov, Al-Farabi Kazakh National University, Almaty, Kazakhstan, 21.01.2016-16.03.2016.

2. I. S. Ishmukhamedov, Al-Farabi Kazakh National University, Almaty, Kazakhstan, 11.07.2016-04.09.2016.

3. D. M. Janseitov, Institute of Nuclear Physics, Almaty, Kazakhstan, 22.05.2016–03.06.2016.

4. O. P. Klimenko, Physics Institute, Bonn University, Bonn, Germany, 17.04.2016-22.04.2016.

5. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 17.04.2016 - 26.04.2016.

6. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 06.06.2016 - 13.06.2016.

7. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 08.11.2016–16.11.2016.

8. V.N.Kondratyev, Bielefeld University, Bielefeld, Germany, 06.07.2016 – 10.08.2016.

9. V.N.Kondratyev, Bielefeld University, Bielefeld, Germany, 31.08.2016 – 06.10.2016

10. V.N.Kondratyev, Basel University, Basel, Switzerland, 28.09.2016 – 02.10.2016.

11. V.N.Kondratyev, RAS Institute of Space Research, Moscow, Russia, 20.12.2016–30.12.2016.

12. V. S. Melezhik, Center for Optical Quantum Technologies, University of Hamburg, Hamburg, Germany, 06.02.2016–13.02.2016.

13. V. S. Melezhik, WE-Heraeus Center Bad Honnef, and Center for Optical Quantum Technologies, University of Hamburg, Hamburg, Germany, 08.05.2016–18.05.2016.

14. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 11.07.2016–19.07.2016.

15. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 29.11.2016–07.12.2016.

16. Y.V. Popov, Institute of Condensed Matter and Nanosciences, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 17.04.2016–14.05.2016.

17. Y.V. Popov, Institute of Condensed Matter and Nanosciences, Université Catholique de Louvain, Louvain-la-Neuve, Belgium, 07.11.2016–05.12.2016.

18. E. A. Soloviev, Max Planck Institute, Dresden, Germany, 18.09.2016–25.09.2016.

19. D. S. Valiolda, Scientific Research Institute of Experimental and Theoretical Physics, Almaty, Kazakhstan, 06.08.2016–11.09.2016.

20. D. S. Valiolda, Department of Nuclear and Theoretical Physics, Kazakh National University, Almaty, Kazakhstan, 26.09.2016–27.11.2016.

21. S. I. Vinitsky, University of Maria Curie-Sklodowska, Lublin, Poland, 15.05.2016–29.05.2016.

22. S. I. Vinitsky, University of Maria Curie-Sklodowska, Lublin, Poland, 26.09.2016–11.10.2016.

6 Visitors

1. Christian Fey, Physics Department, University of Hamburg, Hamburg, Germany, 03.07.2016–07.07.2016.

2. Andrzej Góźdź, Maria Curie-Sklodowska University, Lublin, Poland 07.06.2015–19.06.2015.

3. Zbigniew Idziazsek, Physics Department, University of Warsaw, Warsaw, Poland, 30.11.2016–03.12.2016.

4. Saidakhmat N. Lakaev, Samarkand State University, Samarkand, Uzbekistan, 03.07.2016–08.07.2016.

5. Antonio Negretti, ZOQ, University of Hamburg, Hamburg, Germany, 30.11.2016–03.12.2016.

6. S.A.Rakityansky, Department of Physics, University of Pretoria, Pretoria, South Africa, 01.07.2016–17.08.2016.

7. János Révai, Research Institute for Nuclear and Particle Physics, Budapest, Hungary, 03.07.2016–09.07.2016.

8. Paul Vaandrager, Department of Physics, University of Pretoria, Pretoria, South Africa, 29.08.2016–19.10.2016.

7 Teaching

1. D. M. Janseitov, seminar course on ”Nuclear Radiation Detectors” at Faculty of Physics and Technology, Al Farabi Kazakh National University, (Almaty, Kazakhstan), 05.09.2016-07.10.2016.

2. O. P. Klimenko: Dubna State University, seminars “General physics”(Electricity and Magnetism) (September–December 2016).

3. O. P. Klimenko: Dubna State University, seminars “Mathematical modeling and numerical methods” (February–June and September–December 2016).

4. E. A. Kolganova: PhD adviser of O. Klimenko, Dubna State Univeristy.

5. E. A. Kolganova: Diploma adviser of E. Mardyban (master thesis), student of Dubna State University, Dubna.

6. E. A. Kolganova: Diploma adviser of E. Mardyban (bachelor diploma), student of Dubna University.

7. E. A. Kolganova: Diploma adviser of V. Shalaev (bachelor diploma), student of Dubna State University.

8. E. A. Kolganova: Diploma adviser of I. Zhizhin (bachelor diploma), student of Dubna State University.

9. E. A. Kolganova: Dozent of the Dubna State University, lecture course “Mathematical modeling and numerical methods” (February–June and September–December, 2016).

10. E.A. Koval: seminars for first-year students “Physics of macrosystems”, Dubna University.

11. E. A. Koval: seminars and colloquia for first-year students on Physics of Macrosystems; extra seminars for first-year students on General Physics: Mechanics”.

12. V. S. Melezhik: Professor of the Dubna University, lecture course “General physics”(all the academic year), lecture course “Modern problems and methodology of physics” (September–December 2016).

13. V. S. Melezhik: Ph. D. Thesis adviser of E.A. Koval, Ph. D. student of the State University “Dubna”, Dubna.

14. V. S. Melezhik: Ph. D. Thesis adviser of O.A. Koval, Ph. D. student of the JINR University Center, Dubna.

15. V. S. Melezhik: Ph. D. Thesis adviser of I. Ishmukhamedov, Jr.Sc. of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP JINR, Dubna.

16. V. S. Melezhik: Ph. D. Thesis adviser of D. Valiolda, Ph. D student of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP JINR, Dubna.

17. V. S. Melezhik: Ph. D. Thesis adviser of D. Dzhanseitov, Jr.Sc. of Al-Farabi Kazakh National University, Almaty, Republic of Kazakhstan and BLTP JINR, Dubna.

18. A. K. Motovilov: Professor of Dubna State University, lectures and seminars on the course “Scattering theory for few-body systems” for 5th year students (September – December 2016).

19. Y.V. Popov, co-adviser of A.Galstyan, Ph. D student of the Université Catolique de Louvain, Louvain-la-Neuve, Belgium.

20. D. S. Valiolda: Kazakh National University, seminar course “Introduction to physics of elementary particles and atomic nuclei” (February–April 2016).

21. D. S. Valiolda: Kazakh National University, seminar course “Nuclear physics at low energies” (May–June 2016).

22. S. I. Vinitsky: Bc.S. thesis adviser of I.V. Abdalin (Tver State University, Tver).

23. S. I. Vinitsky: Bc.S. thesis adviser of P.V. Sorokin (Tver State University, Tver).

8 Organizational activity

1. O. P. Klimenko: Secretary of the 23 Scientific Conference of students and young scientists Dubna State University (21 – 31 March 2016, Dubna).

2. O.P. Klimenko: Member of Local Organizing Committee, The International Session-Conference of SNP PSD RAS “Physics of Fundamental Interactions” (12 – 15 April, 2016, Dubna, Russia).

3. O. P. Klimenko: Member of Organizing Committee, Summer School-Conference in Physics for Teachers and Students (11–23 July 2016, Dubna, Russia).

4. O. P. Klimenko: Member of Organizing Committee, International Workshop on Few-Body Systems (July 4–7, 2016, Dubna, Russia).

5. E. A. Kolganova: Member of the BLTP STC.

6. E. A. Kolganova: Scientific Secretary of the JINR STC.

7. E. A. Kolganova: Member of Scientific Council of Dubna State University.

8. E. A. Kolganova: Scientific Secretary of the Council for conferring of bachelor and magister degrees at the Theoretical Physics Department, Dubna State University.

9. E. A. Kolganova: Member of Editorial Board of the journal"Mathematical Modelling and Geometry"’

10. E. A. Kolganova, Scientific Secretary of the International Session-Conference of SNP PSD RAS “Physics of Fundamental Interactions” (12–15 April, 2016, Dubna, Russia).

11. E. A. Kolganova: Co-Chairperson, International Workshop on Few-Body Systems (July 4–7, 2016, Dubna, Russia).

12. E. A. Kolganova: Support of the BLTP Website.

13. V. N. Kondratyev: Member of Editorial Board of the International Journal of Astronomy and Astrophysics.

14. V. N. Kondratyev: Member of Editorial Board of the International Journal of Advanced Astronomy.

15. V. N. Kondratyev: Member of Editorial Board of "Research and Applications in Astronomy".

16. O. A. Koval: Member of the JINR Committee on youth.

17. O. A. Koval: Member of the Public Council of the JINR Directorate on Cooperation with local authorities of Dubna.

18. O. A. Koval: Member of the Committee on the modernization of the general, social and engineering infrastructure of JINR.

19. O. A. Koval: Chairman of the Summer School on Physics for teachers and students 07/16.

20. O. A. Koval: Member of the Organizing Committee of the Russian-Spanish Congress: Particle, Nuclear, Astroparticle Physics and Cosmology 09/17.

21. O. A. Koval: Member of the Local Organizing Committee of the International Session-Conference of the Section of Nuclear Physics of PSD RAS 04/16.

22. A.V.Malykh: Scientific Secretary International Workshop on Few-Body Systems (4 – 7 July 2016, Dubna, Russia).

23. A.V.Malykh: Secretary of the Few-body systems seminar.

24. V. S. Melezhik: Member of Organizing Committee, International Workshop on Few-Body Systems (July 4–7, 2016, Dubna, Russia),

25. V. S. Melezhik: Member of the D. Sc. Panel of LIT, JINR.

26. V. S. Melezhik: Federal expert of Russian Ministry of Education and Science (since 27.02.2014).

27. A. K. Motovilov: Co-Chairperson, International Workshop on Few-Body Systems (July 4–7, 2016, Dubna, Russia).

28. A. K. Motovilov: Member of the Scientific Advisory Committee, International Conference "Nuclear Theory in the Supercomputing Era – 2016" (19–23 September 2016, Khabarovsk, Russia).

29. A. K. Motovilov: Member of Editorial Board of the "Few-Body Systems" journal.

30. A. K. Motovilov: Member of the BLTP NTS.

31. Y.V. Popov: Member of Organizing Committee, International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS2016) (Moscow M. V. Lomonosov State University, Moscow, Russia), 23 –26 August 2016.

32. Y.V. Popov: Member of the Scientific Council, SINP, MSU.

33. Y.V. Popov: Invited Editor of the EPJD special volume for the contributed papers to "International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS2016) (Moscow Lomonosov State University, Moscow, Russia), 23 –26 August 2016)".

34. V. V. Pupyshev: Member of Organizing Committee, International Workshop on Few-Body Systems (FBS-Dubna-2016) (July 4-7, 2016, JINR Dubna). http://theor.jinr.ru/ fbs2016/.

35. S. I. Vinitsky: Member of Program Committee, Saratov Fall Meeting - 16, Workshop on Laser Physics and Photonics XVIII (September 27-30, 2016 Saratov, Russia) .

36. S. I. Vinitsky: Member of International Advisory and Program Committees, 4th International Symposium "Optics and its Applications" (OPTICS-2016) (July 25-28, 2016, Yerevan–Ashtarak, Armenia) .

37. S.I. Vinitsky: Editor-in-Chief of Mathematical Modelling and Geometry .

38. S.I. Vinitsky: Member of the Dissertational Council D 212.203.28, RUDN, Moscow.

9 Awards, prizes, thesis defences, etc.

1. S. I. Vinitsky, 2015 Second JINR Prize for the work "Problem-oriented complex of programs for solving boundary value problems in the dynamics of few-body quantum systems".