Few-Body Systems Group (Sector 11) at BLTP, JINR

2013 Annual Activity Report

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1 Staff of the BLTP Sector 11 in 2013

1. Vladimir B. Belyaev, Prof., Dr. Sc., Principal Researcher
2. Sabit S. Kamalov, Dr., Senior Researcher
3. Elena A. Kolganova, Dr., Senior Researcher
4. Vladimir N. Kondratyev, Dr., Senior Researcher
5. Anastasia V. Malykh, Dr., Researcher
6. Vladimir S. Melezhik, Dr. Sc., Leading Researcher
7. Alexander K. Motovilov, Dr.Sc., Head of Sector
8. Vasily V. Pupyshev, Dr.Sc., Leading Researcher
9. Ivan I. Shlyk, M.Sc., Researcher
10. Evgeni A. Solov'ev, Dr.Sc., Leading Researcher

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

The concept of dynamical adiabatic states, originally proposed to describe one-electron atom(ion)-ion collision systems was developed and the properties of the corresponding dynamical adiabatic potential energy curves were studied for a complete range of internuclear distances R [GS]. The advantages of a dynamical adiabatic basis are threefold. First, it is compatible with the boundary conditions, whereas in standard adiabatic two-Coulomb center basis we have nonvanishing inelastic transitions as $R \to \infty$. Second, rotational transitions are transformed into radial transitions via a type of hidden crossings in contrast with the standard adiabatic basis, where these transitions could only be included by numerical close-coupling calculations. And third, the ionization process can be described by using a basis of the complete discrete orthogonal wave packets, that is much more satisfactory for the process compared with the standard adiabatic approach which employs the continuum states having no direct physical meaning.

В [GS] разработана концепция динамических адиабатических состояний для описания столкновений одноэлектронных атомов и ионов. Соответствующие динамические адиабатические потенциальные кривые исследованы для всего диапазона межядерных расстояний R. Преимущество динамического адиабатического базиса определяется его следующими тремя достоинствами. Во-первых, такой базис совместим с граничными условиями, тогда как при использовании стандартного двухцентрового кулоновского базиса неупругие переходы не исчезают и при $R \to \infty$. Во-вторых, благодаря скрытым пересечениям, переходы между вращательными состояниями преобразуются в радиальные переходы; в стандартном адиабатическом базисе вращательные переходы могут быть включены в схему лишь численно путем использования связанных каналов. В-третьих, процессы ионизации могут быть описаны в базисе из дискретных ортогональных волновых пактов, что в большей степени соответствует физике таких процессов; в стандартном адиабатическом методе используются состояния континуума, не имеющие прямого физического смысла.

[GS] T. P. Grozdanov and E. A. Solov'ev, "Dynamical adiabatic theory of atomic collisions: The global structure of dynamical adiabatic potential energy curves", *Phys. Rev. A* ***88****, 022707 (2013) [10 pages]*

A nonperturbative theoretical approach to treat collisions with generic anisotropic interactions in quasi-one-dimensional geometries has been developed in [GMS]. This approach avoids the limitations of pseudopotential theory and allows one to include accurately long-range anisotropic interactions. For ultracold dipolar collisions in a harmonic waveguide, it predicts dipolar confinement-induced resonances which are attributed to different angular momentum states. The analytically derived resonance condition reveals in detail the interplay of the confinement with the anisotropic nature of the dipole-dipole interactions. The results obtained are in excellent agreement with ab initio numerical calculations confirming the robustness of the presented approach. The exact knowledge of the positions of epy confinement-induced resonances may pave the way for the experimental realization of, e.g., Tonks-Girardeau-like or super-Tonks-Girardeau-like phases in effective one-dimensional dipolar gases.

Непертурбативный теоретический подход к описанию ультрахолодных анизотропных столкновений в квази-одномерной геометрии атомных ловушек разработан в [GMS]. Устранены

ограничения использованных ранее псевдопотенциальных приближений. Получены аналитические формулы (которые прекрасно согласуются с результатами численных расчетов), предсказывающие положение дипольных резонансов, индуцированных конфайнментом. Использование таких резонансов открывает широкие возможности для экспериментальной реализации и управления дипольными многочастичными фазами, такими, например, как плотный ультрахолодныой газ полярных молекул, дипольные кристаллы, а также одномерные дипольные версии газов Тонкса-Жирардо и супер-Тонкса-Жирардо.

[GMS] P. Giannakeas, V. S. Melezhik, and P. Schmelcher, "Dipolar confinement-induced resonances of ultracold gases in waveguides", *Phys. Rev. Lett.* ***111****, 183201 (2013) [5 pages]*.

A new, essentially more strong bound on the rotation of a spectral subspace of a self-adjoint Hamiltonian under generic additive perturbations has been found in [AM]. The proof of this bound is based on using a new $\sin 2\theta$ theorem that provides a local estimate on the maximal angle between unperturbed and perturbed spectral subspaces. Another ingredient of the proof is the triangle inequality for maximal angles between arbitrary subspaces of the Hilbert space.

В [AM] установлена новая, существенно более сильная оценка на поворот спектральных подпространств самосопряженного оператора под действием аддитивных возмущений общего вида. Доказательство этой оценки основывается на новой $\sin 2\theta$-теореме, дающей локальную оценку на операторный угол между возмущенным и невозмущенным спектральными подпространствами. При доказательстве используется также неравенство треугольника для максимальных углов между произвольными подпространствами гильбертова пространства.

[AM] S. Albeverio and A. K. Motovilov, "Sharpening the norm bound in the subspace perturbation theory", *Complex Analysis and Operator Theory 7, 1389–1416 (2013)*.

3 Publications

3.1 Journal publications

1. S. Albeverio and A. K. Motovilov, "Sharpening the norm bound in the subspace perturbation theory", *Complex Analysis and Operator Theory 7, 1389–1416 (2013)*.

2. B. F. Irgaziev, V. B. Belyaev, and J.-U. Nabi, "Three-body calculation of the rate of reaction $p+p+e \to d+\nu_e$ in the Sun", *Phys. Rev. C* ***87****, 035804 (2013) [8 pages]* .

3. P. Giannakeas, V. S. Melezhik, and P. Schmelcher, "Dipolar confinement-induced resonances of ultracold gases in waveguides", *Phys. Rev. Lett.* ***111****, 183201 (2013) [5 pages]*.

4. T. P. Grozdanov and E. A. Solov'ev, "Dynamical adiabatic theory of atomic collisions: The global structure of dynamical adiabatic potential energy curves", *Phys. Rev. A* ***88****, 022707 (2013) [10 pages]*

5. V. S. Melezhik, "Quantum scattering problem without partial-wave analysis", *Phys. Atom. Nucl.* ***76****, 139–146 (2013)*.

6. V. V. Pupyshev, "Proton-hydrogen reaction in an effectively two-body model", *Phys. Atom. Nucl.* ***76****, 171–188 (2013)*.

7. V. V. Pupyshev, “Proton scattering by a hydrogen atom in an effectively two-body model”, *Phys. Atom. Nucl.* ***76****, 155–170 (2013)*.

8. N. S. Simonovic and E. A. Solov’ev, “Analysis of hyperspherical adiabatic curves of helium: A classical dynamics study”, *Phys. Rev. A* ***87****, 052503 (2013) [18 pages]*.

3.2 Articles in paper collections/conference proceedings

1. V. S. Melezhik, S. Saeidian, and P. Schmelcher, “Shifts and widths of Feshbach resonances in atomic waveguides”, *Report of Bogoliubov Laboratory of Theoretical Physics, JINR, for 2011–2012, JINR, Dubna, 2013. P. 83–84.*

3.3 Articles accepted for publication

1. B. F. Irgaziev and V. B. Belyaev, “Three-body treatment of the *pep* reaction in the Sun”, *Few-Body Systems, DOI: 10.1007/s00601-013-0748-4* [4 pages].

2. O. I. Kartavtsev and A. V. Malykh, “Recent advances in description of few two-component fermions”, *Phys. Atom. Nucl. 77 (2014)* (accepted for publication).

3. O. P. Klimenko and E. A. Kolganova, “Rare gas clusters at ultra low energies”, *Proceedings of the XXth Conference of Students and Young Scientists*, University “Dubna” (in press)

4. E. A. Kolganova, “Ultracold scattering and universal correlations”, *Few-Body Systems* (accepted for publication); *arXiv:1312.6955*.

5. A. A. Korobitsin, N. N. Voitishin, “Expediency of using the ’peaceful’ atom”, *Russian Journal of Philosophical Sciences* (accepted for publication).

6. E. A. Koval, O. A. Koval, and V. S. Melezhik, “Numerical solution of two-dimensional scattering problem”, *PEPAN Letters* (accepted for publication).

7. O. A. Koval and E. A. Koval, “Modeling the bound states of quantum systems in two-dimensional geometry of atomic traps”, *Vestnik RUDN, Seria: Matematika. Informatika. Fizika* (accepted for publication).

8. V. S. Melezhik,“Nondirect product discrete-variable representation in low-dimensional few-body problems”, *Phys. Atom. Nucl.* (accepted for publication).

9. A. K. Motovilov, “Eigenvectors of multi-channel scattering matrix at resonance energy values”, *Phys. Atom. Nucl.* (accepted for publication).

10. A. K. Motovilov, “On applying the subspace perturbation theory to few-body Hamiltonians”, *Few-Body Systems, DOI: 10.1007/s00601-013-0752-8, [4 pages]; arXiv:1311.6604*.

11. V. V. Pupyshev, “Scattering of a slow quantum particle by a central short-range potential”, *Phys. Atom. Nucl.* (accepted for publication).

12. V. V. Pupyshev, “Scattering of a slow quantum particle by an axially symmetrical potential”, *Phys. Atom. Nucl.* (accepted for publication).

13. V. V. Pupyshev, “Energies of weakly-bound and near-threshold resonance states of a quantum particle in the two-dimensional plane”, *Theor. Math. Phys.* (accepted for publication).

3.4 Preprints and data bases

1. V. B. Belyaev, P. Ricci, F. Šimkovic, J. Adam, Jr., M. Tater, and E. Truhlik, "Strongly magnetized iron white dwarfs and the total lepton number violation", *arXiv:1312.5343 [4 pages]*.

2. I. S. Ishmukhamedov, D. S. Valiolda, and S. A. Zhaugasheva, "Description of ultracold atoms in a one-dimensional geometry of a harmonic trap with a realistic interaction", *arXiv:1308.1298*.

3. V. V. Pupyshev, "Length and effective radius of two-dimensional scattering of a quantum particle by a central short-range potential", JINR Preprint P4-2013-79, Dubna, JINR, 2013.

4. V. V. Pupyshev, "Energies of weakly-bound and near-threshold resonance states of a quantum particle in the two-dimensional plane", JINR Preprint P4-2013-81, Dubna, JINR, 2013.

5. V. V. Pupyshev, "Effective-range approximation in the problem of two-dimensional scattering by a central short-range potential", JINR Preprint P4-2013-85, Dubna, JINR, 2013.

3.5 Conference presentations

1. V. B. Belyaev and B. Irgaziev, "Three-body treatment of the *pep* reaction in the Sun", The 22nd European Conference on Few-Body Problems in Physics (September 9–13, 2013, Cracow, Poland), section talk.

2. E. A. Kolganova, "Ultracold scattering and universal correlations", The 22nd European Conference on Few-Body Problems in Physics (September 9–13, 2013, Cracow, Poland), section talk.

3. E. A. Kolganova, "Helium trimer and universal correlations", The Third International School on Symmetry in Integrable Systems and Nuclear Physics (July 3–13, 2013, Tsakhkadzor, Armenia), oral presentation.

4. E. A. Koval, O. A. Koval, and V. S. Melezhik, "Numerical solution of two-dimensional quantum scattering problem", The XI Kurchatov Youth Scientific School-Conference (November 12–15, 2013, Moscow, Russia), section talk.

5. E. A. Koval, O. A. Koval, and V. S. Melezhik, "Modeling the bound states of quantum systems in two-dimensional geometry of atomic traps", The XI Kurchatov Youth Scientific School-Conference (November 12–15, Ноября 2013, Moscow, Russia), section talk.

6. E. A. Koval, O. A. Koval, and V. S. Melezhik, "Modeling the bound states of quantum systems in two-dimensional geometry of atomic traps", International Conference on Mathematical Modeling and Computational Physics (MMCP'2013) (July 8–12, 2013, Dubna, Russia), poster.

7. E. A. Koval, O. A. Koval, and V. S. Melezhik, "Numerical solution of 2D scattering problem", The 37th Meeting of the Programme Advisory Committee for Nuclear Physics", (January 24–25, 2013, JINR, Dubna, Russia), poster.

8. A. V. Malykh, "0^+ states of ^{12}C in the alpha-cluster model", IN2P3-BLTP Workshop "Recent Achievements in Nuclear Theory" (July 22–27 2013, JINR, Dubna, Russia), oral presentation.

9. V. S. Melezhik, "Ultracold few-body processes in atomic traps", 37th meeting of PAC for Nuclear Physics (January 24—25, 2013, Dubna, Russia), oral presentation.

10. V. S. Melezhik "Resonances in ultracold collisions confined by atomic traps", The International Conference "Mathematical Modeling and Computational Physics", MMCP2013 (July 8–12, 2013, Dubna, Russia), plenary talk.

11. V. S. Melezhik, "Resonances in ultracold collisions confined by atomic traps", 11th European Conference on Atoms, Molecules and Photons, ECAMP11 (June 24–28, 2013, Aarhus, Denmark), contributed talk

12. V. S. Melezhik, "Three- and four-dimensional spatial modeling of atomic electron dynamics and high-harmonics generation in strong laser field", 22nd International Laser Physics Workshop, LPHYS'13 (July 15–19, 2013, Prague, Czech Republic), oral presentation.

13. V. S. Melezhik, "Resonances in ultracold collisions confined by atomic traps", 22nd International Laser Physics Workshop, LPHYS'13 (July 15–19, 2013, Prague, Czech Republic), oral presentation.

14. A. K. Motovilov, "Bounds on the shifts of binding energies and variation of the spectral subspaces of few-body Hamiltonians", The 22nd European Conference on Few-Body Problems in Physics (September 9–13, 2013, Cracow, Poland), section talk.

15. A. K. Motovilov, "Sharp norm bounds on variation of spectral subspaces", Miniworkshop on Spectral and Perturbation Theory of Selfadjoint Operators in Krein Spaces (January 30–31, 2013, Graz, Austria), invited lecture.

3.6 Seminar talks

1. V. B. Belyaev, "Neutrino from hydrogen burning in the Sun", Seminar at the Institute for Nuclear Physics, Řež, Czech Republic, May 4, 2013.

2. T. P. Grozdanov and E. A. Solov'ev, "Dynamical adiabatic theory of atomic collisions: The global structure of dynamical adiabatic potential energy curves", Seminar on Nuclear Theory, BLTP, JINR, Dubna, September 23, 2013.

3. E. A. Koval, O. A. Koval, and V. S. Melezhik, "Anisotropic quantum scattering in plane", Seminar on Few-Body Systems, BLTP, November 26, 2013.

4. A. K. Motovilov, "Sharpening the norm bound on variation of the spectral subspace of a self-adjoint operator", Seminar "Operator Models in Mathematical Physics" at the Department of function theory and functional analysis, M. V. Lomonosov Moscow State University, March 1, 2013.

5. E. A. Solov'ev, "Dynamical adiabatic theory of atomic collisions", Seminar at Faculty of Physics, St. Petersburg State University, St. Petersburg, September 13, 2013.

4 Visits

4.1 Conferences, schools

1. V. B. Belyaev, The 22nd European Conference on Few-Body Problems in Physics (Cracow, Poland), 08.09.2013–12.09.2013.

2. E. A. Kolganova, The 22nd European Conference on Few-Body Problems in Physics (Cracow, Poland), 08.09.2013–14.09.2013.

3. E. A. Kolganova, The Third International School on Symmetry in Integrable Systems and Nuclear Physics (Tsakhkadzor, Armenia), 03.07.2013–13.07.2013.

4. E. A. Koval, Summer School-Practicum "Computer Continuum: Technologies and Instruments of High-Speed Computations" (St. Petersburg, Russia), 26.06.13–30.06.13.

5. E. A. Koval, The XI Kurchatov Youth Scientific School-Conference (Moscow, Russia), 12.11.13–15.11.13.

   O. A. Koval, Summer School-Practicum "Computer Continuum: Technologies and Instruments of High-Speed Computations" (St. Petersburg, Russia), 26.06.13–30.06.13.

6. O. A. Koval, The XI Kurchatov Youth Scientific School-Conference (Moscow, Russia), 12.11.13–15.11.13.

7. V. S. Melezhik, 11th European Conference on Atoms, Molecules and Photons, ECAMP11 (Aarhus, Denmark), 24.06.13–28.06.13.

8. V. S. Melezhik, 22nd International Laser Physics Workshop, LPHYS'13 (Prague, Czech Republic), 15.07.13–19.07.13.

9. A. K. Motovilov, Miniworkshop on Spectral and Perturbation Theory of Selfadjoint Operators in Krein Spaces (Graz, Austria), 29.01.2013–01.02.2013.

10. A. K. Motovilov, The 22nd European Conference on Few-Body Problems in Physics (Cracow, Poland), 08.09.2013–14.09.2013.

4.2 Collaboration visits

1. V. B. Belyaev, Institute for Nuclear Physics, Řež, Czech Republic, 12.05.2013–26.05.2013.

2. V. B. Belyaev, Physics Institute, Bonn University, Bonn, Germany, 30.01.2013–04.03.2013.

3. S. S. Kamalov, Universität Mainz, Mainz, Germany, 15.04.2013-15.05.2013.

4. S. S. Kamalov, Universität Mainz, Mainz Germany, 19.08.2013-19.09.2013.

5. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 17.04.2013–26.04.2013.

6. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 04.12.2013–16.12.2013.

7. V. S. Melezhik, Center of Quantum Optics, Physics Department, University of Hamburg, Hamburg, Germany, 13.01.2013–23.01.2013.

8. V. S. Melezhik, Center of Quantum Optics, Physics Department, University of Hamburg, Hamburg, Germany, 01.08.2013–15.09.2013.

9. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 19.06.2013–30.06.2013.

10. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 12.12.2013–18.12.2013.

5 Visitors

1. A. Adamczak, Institute of Nuclear Physics of Polish Academy of Sciences, Cracow, Poland, 03.06.2013–09.06.2013.

2. Claudio Cacciapuoti, Hausdorff Center for Mathematics, Bonn University, Bonn, Germany 26.11.2013–30.11.2013.

3. Tasko P. Grozdanov, Institute of Physics, Belgrade, Serbia, 20.05.2013–03.06.2013.

4. Tasko P. Grozdanov, Institute of Physics, Belgrade, Serbia, 22.09.2013–28.09.2013.

5. Yaroslav Y. Koptelov, Faculty of Physics, St. Petersburg State University, Russia, St. Petersburg, 02.12.2013–03.12.2013.

6. Ronald McCarroll, Laboratoire de Chimie Physique-Matiere et Rayonnement, Université Pierre et Marie Curie, Paris, France, 22.09.2013–29.09.2013.

7. János Révai, Research Institute for Nuclear and Particle Physics, Budapest, Hungary, 12.06.2013–26.06.2013.

8. Werner Sandhas, Physics Institute, Bonn University, Bonn, Germany, 11.06.2013–23.06.2013

9. Nina V. Shevchenko, Institute of Nuclear Physics, Řež, Czech Republic, 09.06.2013–23.06.2013

6 Teaching

1. V. B. Belyaev: Professor of the Dubna University, lecture course “Nuclear Astrophysics”.

2. V. B. Belyaev: Scientific adviser for summer practice of Andrey Babic, student of Comenius University in Bratislava, Slovakia.

3. E. A. Kolganova: Ph.D. adviser of A. Korobitsin, UNC JINR, Dubna.

4. E. A. Kolganova: Diploma adviser of O. Klimenko (master thesis), student of Dubna University, Dubna.

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

6. E. A. Kolganova: Dozent of the Dubna University, lecture course "Mathematical modeling and numerical methods" (February–June and September–December, 2013).

7. V. S. Melezhik: Professor of the Dubna University, lecture course "General physics" (all the academic year), lecture course "History and methodology of physics" (September–December 2013), lecture course "Modern problems of quantum physics" (September–December 2013).

8. V. S. Melezhik: Ph. D. Thesis co-adviser of Panagiotis Giannakeas, Ph. D. student at Institute of Laser Physics, University of Hamburg, Hamburg, Germany. Ph.D. Dissertation "Higher partial wave and dipolar confinement-induced resonances" has been successfully defended on 12.08.2013.

9. V. S. Melezhik: Diploma (master thesis) adviser of O.A.Koval and E.A.Koval, students of Dubna University, Dubna. Master theses "Modeling bound states of of quantum systems in two-dimensional geometry of quantum traps" by O.A.Koval and "Two-dimensional scattering problem of quantum particle on anisotropic potential" by E.A.Koval have been successful defended in June 2013.

10. V. S. Melezhik: Diploma adviser (bachelor diploma) of N. Korshunova, student of Dubna University, Dubna. Diploma "Modeling of resonance effects in quantum particle collisions" was defended by her in June 2013.

11. V. S. Melezhik: Ph. D. Thesis co-adviser of E.A. Koval, Ph. D. student of Dubna University, Dubna.

12. V. S. Melezhik: Ph. D. Thesis co-adviser of O.A. Koval, Ph. D. student of JINR University Center, Dubna.

13. A. K. Motovilov: Professor of the Dubna University, lectures and seminars on the course "Scattering theory for few-body systems" for 6th year students (September – December 2013).

14. A. K. Motovilov: Scientific adviser for summer practice of Miroslav Macko, student of Comenius University in Bratislava, Slovakia.

15. A. K. Motovilov: Diploma (master thesis) adviser of D. Polyakov, student of Dubna University, Dubna.

16. V. V. Pupyshev: Superviser of Student practice (3rd stage) project "Low-energy electron-neutron scattering" (JINR, Dubna, September 09–29, 2013) for Kewely E. Foka and Seithati A. Tebele, students of University of the Free State, South Africa.

7 Organizational activity

1. V. B. Belyaev: Member of the D. Sc. Panel of BLTP, JINR.
2. V. B. Belyaev: Member of Advisory Committee, The 22nd European Conference on Few-Body Problems in Physics (September 9–13, 2013, Cracow, Poland)
3. V. B. Belyaev: Member of Organizing Committee, DIAS-TH XII Winter School "Few-Body Systems: Theory and Applications" (2 – 8 February 2014, Dubna, Russia).
4. E. A. Kolganova: Member of the BLTP NTS.
5. E. A. Kolganova: Scientific Secretary of the JINR NTS.
6. E. A. Kolganova: Scientific Secretary of the Council for conferring of bachelor and magister degrees at the Theoretical Physics Department, Dubna University.
7. E. A. Kolganova: Scientific Secretary The Third International School on Symmetry in Integrable Systems and Nuclear Physics (03 – 13 July 2013, Tsakhkadzor, Armenia).
8. E. A. Kolganova: Member of Organizing Committee, Advanced Studies Institute on Symmetries and Spin (7 – 13 July 2013, Prague, Czech Republic).
9. E. A. Kolganova: Member of Organizing Committee, The XVth International Workshop on High Energy Spin Physics (8 – 12 October 2013, Dubna, Russia).
10. E. A. Kolganova: Vice-Chairwoman of Organizing Committee, DIAS-TH XII Winter School "Few-Body Systems: Theory and Applications" (2 – 8 February 2014, Dubna, Russia).
11. E. A. Kolganova: Co-editor of the proceedings volume — Proceedings of the 20th International Symposium "Spin Physics" (SPIN2012), *PEPAN* ***44****:6, 264 pp. (2014)*; Eds.: R. Lednicky, A. V. Efremov, and E. Kolganova.
12. E. A. Kolganova: Support of the BLTP Website.
13. A. A. Korobitsin: Member of Organizing Committee, DIAS-TH XII Winter School "Few-Body Systems: Theory and Applications" (2 – 8 February 2014, Dubna, Russia).
14. O. A. Koval: Scientific secretary of AYSS.
15. O. A. Koval: Member of the Soviet of AYSS
16. O. A. Koval: Head direction of social development of AYSS
17. O. A. Koval: Secretary of the Local Organizing Committee, The XVII scientific conference of Association of Young Scientists and Specialists (AYSS-2013) dedicated to the centennial of B. Dzhelepov (08-12 April 2013, Dubna)
18. O. A. Koval: Member of the Organizing Committee, Conference-school of Young Scientists and Specialists of JINR (Alushta'13) (June 3–8, 2013, Alushta, Ukraine)

19. O. A. Koval: Vice-chairman of the Organizing Committee, XVII summer school of Young Scientists and Specialists of JINR (Lipnya'13) (July 19–21, 2013, Lipnya)
20. A. V. Malykh: Secretary of the BLTP Seminar on Few-Body Systems.
21. V. S. Melezhik: Member of the D. Sc. Panel of LIT, JINR.
22. V. S. Melezhik: Member of the BLTP Expert commission.
23. A. K. Motovilov: Member of Editorial Board of the "Few-Body Systems" journal.
24. A. K. Motovilov: Member of the BLTP NTS.
25. A. K. Motovilov: Member of Organizing Committee, DIAS-TH XII Winter School "Few-Body Systems: Theory and Applications" (Dubna, Russia, February 2–8, 2014).

8 Awards, prizes, thesis defences, etc.

1. O. A. Koval: Grant of the governor of the Moscow Region for students.
2. E. A. Koval, O. A. Koval, and V. S. Melezhik: Third Prize for the poster presentation "Numerical solution of 2D scattering problem" at the 37th Meeting of the Programme Advisory Committee for Nuclear Physics" (January 24–25, 2013, JINR, Dubna, Russia).
3. O. A. Koval: Diploma for the best section talk at the XI Kurchatov Youth Scientific School-Conference (Moscow, Russia), 12.11.13–15.11.13.
4. V. S. Melezhik: JINR Second Prize of 2012 for the research series entitled "Multichannel problems in low-dimensional few-body physics".
5. V. S. Melezhik: "Outstanding APS Referee" Award.