

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

2004 Annual Activity Report

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1 Staff of the BLTP Sector 11 in 2004

1. [V.B. Belyaev](#), Prof., Dr. Sc., Principal Researcher
2. [G.S. Bisnovatyi-Kogan](#), Prof., Dr. Sc., Principal Researcher (part-time)
3. [S.S. Kamalov](#), Dr., Senior Researcher
4. [E.A. Kolganova](#), Dr., Senior Researcher
5. [M.Kh. Khankhasaev](#), Dr. Sc., Leading Researcher
6. [A.V. Malykh](#), Junior Researcher (since 07.2004)
7. [A.V. Matveenکو](#), Dr. Sc., Leading Researcher
8. [V.S. Melezhik](#), Dr. Sc., Leading Researcher
9. [A.K. Motovilov](#), Dr., Head of the Group
10. [F.M. Pen'kov](#), Dr. Sc., Leading Researcher (till 09.2004)
11. [V.V. Pupyshev](#), Dr., Senior Researcher
12. [N.V. Shevchenko](#), Dr., Senior Researcher

[A.F. Os'kin](#) (M. Sc., Ph. D. Student)

2 Main Results

A new adiabatic approach for the description of three charged particles in the continuum has been suggested [1]. This approach is based on the Coulomb-Fourier transformation of a three-body Hamiltonian, which allows us to develop a scheme, alternative to the Born-Oppenheimer one. The approach appears as an expansion of the kernels of corresponding integral transformations in terms of small mass-ratio parameter. To be specific, the results are presented for the system ppe in the continuum. The wavefunction of such a system is compared with the one which is used for the estimation of the rate for triple reaction $p + p + e \rightarrow d + \nu$, which takes place as a step of the pp -cycle in the centre of the Sun.

Weakly bound small Helium clusters attract considerable attention, in particular because of the booming interest in Bose-Einstein condensation of ultra-cold gases. Taking this into account, advanced calculations have been performed for the scattering length of collisions of ^3He and ^4He atoms with $^4\text{He}_2$ dimers [2]. These investigations are based on the hard-core version of the Faddeev differential equations. As compared to previous calculations of the same quantity, a much more refined grids were employed, providing an improvement of about 10%.

Using dynamical model DMT (Dubna-Mainz-Taipei) and unitary isobar model MAID a new partial wave analysis of pion photo- and electroproduction from threshold up to total energy $W < 2$ GeV was done. In addition, the older data from the world data base and recent experimental results from JLab for $Q^2 = 1$ (GeV/c) 2 [3] have been analyzed. As a result, the new Q^2 dependence of the e.m. helicity amplitudes have been extracted for the most important nucleon resonances. It was found that the contributions from the pion degrees of freedom to the e.m. resonance amplitudes have to be subtracted in comparison with the quark models results. Using the MAID model, also the nucleon spin structure functions g_1 and g_2 [4] were analyzed and a good description of available data was found.

The effect of the internal structure and rotation of the $dt\mu$ quasi-nucleus on energy levels was studied by using the three-body description of the $(dt\mu)Xee$ molecule based on the hierarchy of scales and corresponding energies of its constituent subsystems. For a number of rovibrational states of the $(dt\mu)dee$ and $(dt\mu)tee$ systems, the shifts and splittings of energy levels were calculated in the second order of the perturbation theory. These results have been published in [5].

A time-dependent approach to the study of the Coulomb breakup in two clusters in scattering on a charged target has been developed. This allowed to perform, for the first time, a “direct” calculation of the muon stripping at the deceleration of the muonic helium atom in deuterium. With this approach the stripping and excitation cross sections were also calculated for collisions of an atomic helium atom ($n < 4$) with a proton [6].

Under the assumption that the spectrum of a self-adjoint Hamiltonian consists of two subordinated subsets, sharp norm estimates have been obtained on variation of the corresponding spectral subspaces under off-diagonal perturbations [7]. These results extend the celebrated Davis-Kahan $\tan 2\Theta$ Theorem. Also several new existence and uniqueness results have been established for contractive solutions to the associated operator Riccati equation.

Two-dimensional simulation of a supernova explosion within the magnetorotational model has been performed for the first time. It has been shown that after the collapse the core consists of a

rapidly rotating proto-neutron star and a differentially rotating envelope [8]. The toroidal part of the magnetic energy generated by the differential rotation grows linearly with time at the initial stage, and it is terminated by the development of magnetohydrodynamic instability, leading to an exponential growth of the magnetic energy. The simulations give the explosion energy of $0.6 \cdot 10^{51}$ ergs, what for the first time explains observations of core-collapsed supernovae.

- [1] V. B. Belyaev, S. B. Levin, and S. L. Yakovlev, *Three charged particles in the continuum: astrophysical examples*, J. Phys. B: At. Mol. Opt. Phys. **37** (2004), 1369–1380.
- [2] E. A. Kolganova, A. K. Motovilov, and W. Sandhas, *Scattering length of the helium-atom-helium-dimer collision*, Phys. Rev. **A70** (2004), 052711-1-4.
- [3] G. Laveissiere, S. Kamalov *et al.* [JLab Hall A Collaboration], *Backward electroproduction of π^0 mesons on protons in the region of nucleon resonances at four momentum transfer squared $Q^2 = 1.0 (GeV/c)^2$* , Phys. Rev. **C 69** (2004), 045203-1-15.
- [4] C. W. Kao, D. Drechsel, S. Kamalov and M. Vanderhaeghen, *Higher moments of nucleon spin structure functions in heavy baryon chiral perturbation theory and in a resonance model*, Phys. Rev. D **69** (2004), 056004-1-15.
- [5] O. I. Kartavtsev, A. V. Malykh, and V. P. Permyakov, *Effect of $dt\mu$ quasinucleus structure on energy levels of the $(dt\mu)Xe$ exotic molecule*, Phys. Rev. A **70** (2004), 022504-1-9.
- [6] V. S. Melezhik, J. S. Cohen, and C.-Y. Hu, *Stripping and excitation in collisions between p and He^+ ($n \leq 3$) calculated by a quantum time-dependent approach with semiclassical trajectories*, Phys. Rev. A **69** (2004), 032709-1-13.
- [7] V. Kostykin, K. A. Makarov, and A. K. Motovilov, *A generalization of the $\tan 2\Theta$ Theorem*, Operator Theory: Advances and Applications **149** (2004), 349–372.
- [8] N. V. Ardeljan, G. S. Bisnovaty-Kogan, K. V. Kosmachevskii, and S. G. Moiseenko, *Two-dimensional simulation of the dynamics of the collapse of a rotating core with formation of a neutron star on an adaptive triangular grid in lagrangian coordinates*, Astrofizika **47** (2004), 47–64 (Russian).

3 Publications

3.1 Books

1. Eds. Ch. Teaf, M. Khankhasayev, and B. Yessekin, “Risk Assessment as a Tool for Water Resources Decision-Making in Central Asia”, *NATO Science Series IV, Vol. 34*, Kluwer Academic Publishers, Dordrecht, 2004, 324 pp.

3.2 Journal publications

1. N. V. Ardeljan, G. S. Bisnovaty-Kogan, K. V. Kosmachevskii, and S. G. Moiseenko, “Two-dimensional simulation of the dynamics of the collapse of a rotating core with formation of a neutron star on an adaptive triangular grid in lagrangian coordinates”, *Astrophysics* **47**, 37–51, 2004.
2. A. N. Baushev, and G. S. Bisnovaty-Kogan, “Light curve and neutrino spectrum radiated during a collapse of supermassive nonrotating star”, *Astron. Zh.* **81**, 262–271 (2004).
3. V. B. Belyaev, S. B. Levin, and S. L. Yakovlev, “Three charged particles in the continuum: astrophysical examples”, *J. Phys. B: At. Mol. Opt. Phys.* **37**, 1369–1380 (2004).
4. G. S. Bisnovaty-Kogan, “A simplified model of the formation of structures in the dark matter, and a background of very long gravitational waves”, *Mon. Not. R.A.S.*, **347**, 163–172 (2004).
5. G. S. Bisnovaty-Kogan, “Electromagnetic field around a cylinder with a periodic electrical current energy flux from relativistic jet”, *Astrophysics* **47**, 404–411 (2004).
6. G. S. Bisnovaty-Kogan and V. N. Rudenko, “Very high frequency gravitational wave background in the universe”, *Class. Quant. Grav.* **21**, 3347–3359 (2004).
7. G. S. Bisnovaty-Kogan and A. V. Tutukov, “Magnetorotational Supernova explosions and the formation of neutron stars in close binary systems”, *Astron. Zh.* **81**, 798–806 (2004).
8. S. I. Fedotov, O. I. Kartavtsev, V. I. Kochkin, and A. V. Malykh, “3–cluster structure of the 0^+ states in ^{12}C and the effective $\alpha - \alpha$ interactions”, *Phys. Rev. C* **70**, 014006-1-7 (2004).
9. C. W. Kao, D. Drechsel, S. Kamalov, and M. Vanderhaeghen, “Higher moments of nucleon spin structure functions in heavy baryon chiral perturbation theory and in a resonance model”, *Phys. Rev. D* **69**, 056004-1-15 (2004).
10. O. I. Kartavtsev, A. V. Malykh, and V. P. Permyakov, “Effect of $dt\mu$ quasinucleus structure on energy levels of the $(dt\mu)\text{Xee}$ exotic molecule”, *Phys. Rev. A* **70**, 022504-1-9 (2004).
11. E. A. Kolganova, A. K. Motovilov, and W. Sandhas, “Scattering length of the helium-atom-helium-dimer collision”, *Phys. Rev. A* **70**, 052711-1-4 (2004).
12. V. Kostykin, K. A. Makarov, and A. K. Motovilov, “A generalization of the $\tan 2\Theta$ Theorem”, *Operator Theory: Advances and Applications* **149**, 349–372 (2004).

13. G. Laveissiere, S. Kamalov *et al.* [JLab Hall A Collaboration], “Backward electroproduction of π^0 mesons on protons in the region of nucleon resonances at four momentum transfer squared $Q^2 = 1.0$ (GeV/c)²”, *Phys. Rev. C* **69**, 045203-1-15 (2004).
14. V. S. Melezhik, J. S. Cohen, and C.-Y. Hu, “Stripping and excitation in collisions between p and He^+ ($n \leq 3$) calculated by a quantum time-dependent approach with semiclassical trajectories”, *Phys. Rev. A* **69**, 032709-1-13 (2004).
15. A. K. Motovilov and V. B. Belyaev, “Perturbation of finite-lattice spectral levels by nearby nuclear resonances”, *Particles and Nuclei, Letters* **1** [118], 15–24 (2004).
16. V. V. Pupyshev, “Spline-function method in the three-body problem”, *Phys. Part. Nucl.* **35**:2, 145 – 192 (2004).
17. W. Sandhas, E.A. Kolganova, and Y.K. Ho, and A.K. Motovilov, “Binding energies and scattering observables in the system of three helium atoms”, *Few-Body Systems* **34**, 137–142 (2004).
18. L. Tiator, D. Drechsel, S. Kamalov, M. M. Giannini, E. Santopinto and A. Vassallo, “Electroproduction of nucleon resonances”, *Eur. Phys. J. A* **19**, 55–60 (2004).
19. S. N. Yang, G. Y. Chen, S. S. Kamalov, D. Drechsel, and L. Tiator, “Threshold π^0 photo- and electro-production in a meson-exchange model”, *Nucl. Phys. A* **737**, 248–252 (2004).

3.3 Articles in paper collections

1. V.B. Belyaev, A.K. Motovilov, M.B. Miller, A.V. Sermyagin, I.V. Kuznetsov, A.V. Sermyagin, Yu. G. Sobolev, A. A. Smolnikov, A. A. Klimenko, S.I. Vasiliev, and V. Ugryumov, “Search for spontaneous molecular-nuclear transitions ${}^6\text{LiD} \rightarrow {}^8\text{Be}$ ”, In: *Few-Body Problems in Physics (Proc. of 17th Int. IUPAP Conf. on Few-Body Problems in Physics)*, Elsevier B. V., Amsterdam, 2004, pp. S343–S345.
2. W. Sandhas, E. A. Kolganova, A. K. Motovilov, and Y. K. Ho, “Binding energies and scattering observables in the ${}^3\text{He}{}^4\text{He}_2$ atomic system”, In: *Few-Body Problems in Physics (Proc. of 17th Int. IUPAP Conf. on Few-Body Problems in Physics)*, Elsevier B. V., Amsterdam, 2004, pp. S337-S339.

3.4 Articles accepted for publication

1. M. N. Barkov, G. S. Bisnovaty-Kogan, A. I. Neishtadt, and V. A. Belinski, “On chaotic behavior of gravitating stellar shells”, *Chaos* (to appear).
2. M. N. Barkov and G.S.Bisnovaty-Kogan, “Interaction of a cosmological gamma-ray burst with a dense molecular cloud and the formation of jets”, *Astron. Zh.* (to appear).
3. V. Kostykin, K. A. Makarov, and A. K. Motovilov, “On the existence of solutions to the operator Riccati equation and the $\tan \Theta$ theorem”, *Integral Equations and Operator Theory* (to appear).

4. V. Kostykin, K. A. Makarov, and A. K. Motovilov, “Perturbation of spectra and spectral subspaces”, *Transactions of the American Mathematical Society* (to appear).

3.5 Preprints and data bases

1. S. Albeverio and A. K. Motovilov, “Operator integrals with respect to a spectral measure and solutions to some operator equations”, *arXiv: math.SP/0410577*.
2. M. Kh. Anikina, . . . , N. V. Shevchenko, . . . , “Search for and study of eta-mesic nuclei in pA-collisions at the JINR LHE nuclotron”, *arXiv: nucl-ex/0412036*.
3. Yu. V. Artemova, G. S. Bisnovaty-Kogan, I. V. Igumenshchev, and I. D. Novikov, “Accretion disks around black holes with advection and optical depth transition”, *arXiv: astro-ph/0410249*.
4. G. S. Bisnovaty-Kogan, “Regular particle acceleration in relativistic jets”, *arXiv: astro-ph/0406479*.
5. S. I. Fedotov, O. I. Kartavtsev, V. I. Kochkin, and A. V. Malykh, “3–cluster structure of the 0^+ states in ^{12}C and the effective $\alpha - \alpha$ interactions”, *arXiv: nucl-th/0404016*.
6. H. Fukuda, M. Katuya, E. O. Alt, and A. V. Matveenko, “Nonclassical orthogonal polynomials and corresponding quadratures”, *JINR Preprint E5-2004-69*.
7. O. I. Kartavtsev, A. V. Malykh, and V. P. Permyakov, “Effect of $dt\mu$ quasinucleus structure on energy levels of the $(dt\mu)\text{Xee}$ exotic molecule”, *arXiv: physics/0403116*.
8. G. Laveissiere, . . . , S. Kamalov, . . . [JLab Hall A Collaboration], “Virtual Compton scattering in the resonance region up to the deep inelastic region at backward angles and momentum transfer squared of $Q^2 = 1.0 \text{ GeV}^2$ ”, *arXiv: hep-ex/0406062*.
9. S. G. Moiseenko, G. S. Bisnovaty-Kogan, and N. V. Ardelyan, “Magnetorotational supernova simulations”, *arXiv: astro-ph/0410330*.
10. A. K. Motovilov and A. V. Selin, “Some sharp norm estimates in the subspace perturbation problem”, *JINR Preprint E5-2004-154*; *arXiv: math.SP/0409558*.
11. V. V. Pupyshev, “Spectrum and collapse of particle in the field proportional to the squared secant of the distance”, *JINR Preprint P5-2004-185*.
12. J. Révai and N. V. Shevchenko, “Capture of slow antiprotons by helium atoms”, *arXiv: physics/0412145*.

3.6 Conference contributions

1. V. B. Belyaev, A. F. Os’kin, and W. Sandhas W, “Binding of η_c mesons with light nuclei”, [The XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August, 2004, Groningen, The Netherlands).

2. G. S. Bisnovatyi-Kogan, “Regular particle acceleration in relativistic jets”, [Workshop The Multiwavelength Approach To Unidentified Gamma Ray Sources](#) (1 – 4 June 2004, Hong Kong, China).
3. G. S. Bisnovatyi-Kogan, “Gamma ray bursts: theory versus observations”, [Gamov Memorial International Conference](#) (8 – 14 August 2004, Odessa, Ukraine).
4. G. S. Bisnovatyi-Kogan, “Approximate theory of large-scale structure formation in the universe”, [Second International Conference “Frontiers of Nonlinear Physics”](#) (5 – 12 July 2004, Nizhny Novgorod, Russia).
5. G. S. Bisnovatyi-Kogan, “Dark matter structures and emission of very long gravitational waves”, [International Workshop “Frontier objects in astrophysics and particle physics”](#) (24 – 29 May 2004, Vulcano, Italy).
6. S. S. Kamalov, G. Y. Chen, S. N. Yang, D. Drechsel, and L. Tiator, “ S_{11} resonances in π and η channels”, invited talk at the [Workshop on the Physics of Excited Nucleons \(NSTAR 2004\)](#) (24 – 27 March 2004, Grenoble, France).
7. M. Kh. Khankhasayev, “Overview of NATO/CCMS Pilot Study on Environmental Decision-Making for Sustainable Development in Central Asia”, NATO Advanced Research Workshop on Environmental Security and Sustainable Land Use of the Mountain and Steppe Territories of Mongolia and Altai (24–28 October 2004, Barnaul, Russia).
8. E. A. Kolganova, A. K. Motovilov, and W. Sandhas, “The $^4\text{He}_3$ and $^3\text{He}^4\text{He}_2$ three-atomic systems within Faddeev approach”, The [XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August 2004, Groningen, The Netherlands).
9. V. Kostrykin, K. A. Makarov, and A. K. Motovilov, “Perturbation of spectral subspaces: Some sharp estimates”, [International Conference “Differential Equations and Related Topics”](#) dedicated to I. G. Petrovskii (1901–1973) (16–22 May 2004, Moscow, Russia).
10. A. V. Matveenko and H. Fukuda, “The resolution of the avoided-crossing problem in the hyperradial-adiabatic approach”, The [XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August 2004, Groningen, The Netherlands).
11. A. V. Matveenko, H. Fukuda, and E. O. Alt, “Bessel functions as basis for the coulombic three-body problems”, The [XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August 2004, Groningen, The Netherlands).
12. V. S. Melezhik, “Ultracold atom-atom collisions in a nonresonant laser field”, Special Report at the 8th European Conference on Atomic and Molecular Physics (6 – 10 July 2004, Rennes, France).
13. V.S. Melezhik, “Coulomb Breakup on two and three Quantum Particles in time-Dependent Approach”, the 8th European Conference on Atomic and Molecular Physics (6 – 10 July 2004, Rennes, France).

14. V.S. Melezhik, “Effects of anisotropy in control of ultracold atom-atom collisions in a light field”, Invited Talk at the International Workshop “Mesoscopic Phenomena in Ultracold Matter: From Single Atoms to Coherent Ensembles” (11 – 15 October 2004, Dresden, Germany).
15. S. G. Moiseenko, G. S. Bisnovaty-Kogan, and N. V. Ardelyan, “Magnetorotational supernova simulations”, [International Conference “1604-2004 Supernovae as Cosmological Lighthouses”](#), (16 – 19 June 2004, Padova, Italy).
16. J. Révai and N. V. Shevchenko, “Primary population of antiprotonic helium states”, [The XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August 2004, Groningen, The Netherlands).
17. S. N. Yang, G. Y. Chen, S. S. Kamalov, D. Drechsel, and L. Tiator, “DMT dynamical model”, 10th International Workshop on “Meson-Nucleon Scatterings and Nucleon Structure” (29 August – 4 September 2004, Beijing, China).

4 Visits

4.1 Conferences, schools

1. V. B. Belyaev, [The XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August, 2004, Groningen, The Netherlands).
2. G. S. Bisnovaty-Kogan, Workshop “The Multiwavelength Approach To Unidentified Gamma Ray Sources” (1–4 June 2004, Hong Kong, China).
3. G. S. Bisnovaty-Kogan, [Gamov Memorial International Conference](#) (8–14 August 2004, Odessa, Ukraine).
4. G. S. Bisnovaty-Kogan, [Second International Conference “Frontiers of Nonlinear Physics”](#) (5–12 July 2004, Nizhny Novgorod, Russia).
5. G. S. Bisnovaty-Kogan, [International Workshop “Frontier Objects in Astrophysics and Particle Physics”](#) (24–29 May 2004, Vulcano, Italy).
6. S. S. Kamalov, [Workshop on the Physics of Excited Nucleons \(NSTAR 2004\)](#) (24 – 27 March 2004, Grenoble, France).
7. M. Kh. Khankhasayev, [NATO Advanced Research Workshop on Environmental Security and Sustainable Land Use of the Mountain and Steppe Territories of Mongolia and Altai](#), (24–28 October 2004, Barnaul, Russia).
8. E. A. Kolganova, [The XIXth European Conference on Few-Body Problems in Physics](#) (23–27 August, 2004, Groningen, The Netherlands).
9. A. V. Malykh, [Marie Curie Training program dedicated to neutrino physics](#) (3 June – 27 October, 2004, ECT, Trento, Italy).

10. A. V. Matveenko, The XIXth European Conference on Few-Body Problems in Physics (23–27 August, 2004, Groningen, The Netherlands).
11. V. S. Melezhik, The 8th European Conference on Atomic and Molecular Physics (6–10 July 2004, Rennes, France).
12. V.S. Melezhik, International Workshop “Mesoscopic Phenomena in Ultracold Matter: From Single Atoms to Coherent Ensembles” (11–15 October 2004, Dresden, Germany).
13. A. K. Motovilov, International Conference “Differential Equations and Related Topics” dedicated to I. G. Petrovskii (1901–1973) (16–22 May 2004, Moscow, Russia).
14. A. K. Motovilov, The XIXth European Conference on Few-Body Problems in Physics (23–27 August, 2004, Groningen, The Netherlands).
15. N. V. Shevchenko, The XIXth European Conference on Few-Body Problems in Physics (23–27 August, 2004, Groningen, The Netherlands).

4.2 Collaboration visits

1. V. B. Belyaev, Physics Institute, Bonn University, Bonn, Germany, 10.12.2004 – 25.01.2005.
2. V. B. Belyaev, Joint Meeting of the JINR-HAS collaborators, Budapest, Hungary, 04.09.2004–08.09.2004.
3. G. S. Bisnovaty-Kogan, Max Planck Institute for Radioastronomy, Bonn, Germany, 1.10.2004 – 31.10.2004.
4. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 01.06.2004 – 30.06.2004.
5. E. A. Kolganova, Chemistry Department, Rome University, Rome, Italy, 14.06.2004 – 17.06.2004.
6. S. S. Kamalov, Institute fur Kernphysik, Mainz University, Mainz, Germany, 15.08.2003 – 01.09.2004.
7. S. S. Kamalov, Physics Department, National Taiwan University, Taipei, Taiwan 15.10.2004 – 23.12.2004.
8. E. A. Kolganova, Physics Institute, Bonn University, Bonn, Germany, 25.10.2004 – 24.11.2004.
9. A. V. Matveenko, University of Shizuoka, Shizuoka, Japan, 01.03.2004 – 31.03.2004.
10. A. V. Matveenko, University of Mainz, Mainz, Germany, 15.11.2004 – 29.11.2004.
11. A.V. Matveenko, University of Wroclaw, Poland, 29.11.2004 – 14.12.2004.
12. V. S. Melezhik, Free University of Brussels, Brussels, Belgium, 09.09.2004 – 29.09.2004.

13. A. K. Motovilov, Physics Institute, Bonn University, Bonn, Germany, 01.06.2004 – 30.06.2004.
14. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 01.07.2004 – 09.07.2004.
15. A. K. Motovilov, Physics Institute, Bonn University, Bonn, Germany, 01.10.2004 – 31.10.2004.
16. A. K. Motovilov, Institute for Applied Mathematics, Bonn University, Bonn, Germany, 01.11.2004 – 30.11.2004.
17. N. V. Shevchenko, Theoretical Physics Department, KFKI, Budapest, Hungary, 08.03.2004 – 21.04.2004.
18. N. V. Shevchenko, Physics Institute, Bonn University, Bonn, Germany, 18.05.2004 – 30.06.2004.

5 Visitors

1. L. Cattaneo, Bonn University, Germany, 07.12.2004–17.12.2004.
2. S. B. Levin, St. Petersburg State University, Russia, and University of Stockholm, Sweden, 06.04.2004–13.04.2004.
3. S. B. Levin, St. Petersburg State University, Russia, and University of Stockholm, Sweden, 19.07.2004–25.07.2004.
4. V. N. Ostrovsky, St. Petersburg State University, Russia, 26.05.2004–28.05.2004.
5. R. Pavlov, INRNE, Bulgarian Academy of Sciences, Sofia, Bulgaria, 22.04.2004–06.05.2004.
6. J. Revai, Theoretical Physics Department, KFKI, Budapest, Hungary, 25.06.2004–30.07.2004.
7. W. Sandhas, Bonn University, Germany, 05.07.2004–05.08.2004.



Seminars of Few-Body Community in BLTP

The list of seminars in 2004

2004

Feb 17

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

O.I. Kartavtsev and [A.V.Malykh](#)

Ultralow-energy three-body recombination in a two-component fermionic gas

[abstract](#)

Feb 24

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

O.I. Kartavtsev and [A.V.Malykh](#)

Low-energy universal properties of three-body systems in two dimensions

[abstract](#)

Mar 02

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

[V.S. Melezhik](#)

Time-dependent approach for breakup on two and three quantum particles

[abstract](#)

Apr 20

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

H. Fukuda, M. Katsuya and [A. V. Matveenko](#)

Gaussian Quadratures with arbitrary weight and interval

[abstract](#)

Apr 27

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

[Rossen Pavlov, Bulgaria](#)

Spin and relativistic generalization of density functional and density matrix methods

[abstract](#)

May 24

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

A. I. Machavariani

Relativistic field-theoretical formulation of the three-dimensional equations for the three fermion system

[abstract](#)

Jul 13

Few Body Systems
Seminar of BLTP sector 11

the IV Floor Auditorium, 11.00

N.N.Kolesnikov and S.A. Kalachev (MSU, Moscow)

Lambda-N-potential from analysis of binding energies of hypernuclei and Lambda-p-scattering

[abstract](#)

Sep 28

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

O.A. Rubtsova, Institute of Nuclear Physics, MSU

Development of the Wave-Packet Continuum Discretization method in Quantum Scattering Theory

[abstract](#)

Nov 16

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

[V.V. Pupyshev](#)

Spectrum and collapse of particle in the field proportional to the squared secant of the distance

[abstract](#)

Dec 07

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

L. Grigorenko (Russian scientific center Kurchatov institute)

Studying of ${}^5\text{H}$: experiment and theory

[abstract](#)

Dec 14

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

[Pupyshev V.V. \(BLTP JINR\)](#)

Spectrum and collapse of particle in a nonlocal field of centrifugal type

[abstract](#)

Dec 15

Few Body Systems
Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

Laura Cattaneo (Universitat Bonn, Germany)

Mourre's inequality and embedded bound states

[abstract](#)

Dec 21

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Seminar of BLTP sector 11

the II Floor Auditorium, 11.00

[Pupyshev V.V.](#) (BLTP JINR)

Spurious solutions of three-dimensional Faddeev equations as test-objects

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