

# COLLABORATION IN SCIENCE AND TECHNOLOGY

The main results of the international cooperation in science and technology of the Joint Institute for Nuclear Research in 2012 reflect the following data:

- joint research was conducted with scientific centres in Member States, as well as with international and national organizations in other countries, on 41 topics of first priority and 2 topics of second priority;

- to solve cooperation issues and questions of participation in scientific meetings and conferences, the Joint Institute sent 2793 specialists;

- for joint work and consultations, as well as for participation in meetings, conferences, and schools held at JINR, 2311 specialists were received;

- 51 international scientific conferences and schools, 24 workshops, and 15 meetings were organized and held;

- 18 scholarship holders worked at the Institute laboratories.

The international cooperation of JINR is presented in agreements and treaties. Its development comprises joint experiments at basic facilities of physics centres, the acquisition of research data, preparation of joint publications of the joint research results, the supply of equipment and techniques for the interested sides, etc.

**On 12 January**, at the CNRS Headquarters in Paris, JINR Director V. Matveev, Vice-Director M. Itkis and Chief Scientific Secretary N. Russakovich had an annually organized meeting with the newly elected Director of the Institute of Nuclear Physics and Elementary Particle Physics (IN2P3) of France J. Martino and his deputies.

V. Matveev spoke to the French colleagues about the status of the main JINR projects in the context of the Seven-Year Plan of the Development of JINR. The participants of the meeting exchanged their news in the development of scientific research and scientific cooperation, and discussed issues of financing each out of 20 joint projects.

Ambassador Extraordinary and Plenipotentiary of Italy to RF Antonio Zanardi Landi, accompanied by the Science Attaché of the Italian Embassy in Moscow Pietro Fré, visited JINR **on 20 January**.

JINR Director Academician V. Matveev talked to the guests about the history of JINR, the main achievements, scientific research and projects at the Institute. JINR Vice-Director M. Itkis, JINR Chief Scientific Secretary N. Russakovich, Coordinator of the JINR–Italy cooperation A. Sorin, Chief of the Department of International Relations D. Kamanin, and LRB Director E. Krasavin attended the meeting.

The guests were taken on an excursion to the Veksler and Baldin Laboratory of High Energy Physics and shown the Nuclotron. They were also acquainted with the NICA project there. At the Dzhelepov Laboratory of Nuclear Problems, they visited the memorial study of the famous Italian scientist Academician Bruno Pontecorvo and the complex of proton therapy at the medical beam of the Phasotron. The Italian Ambassador was informed about outstanding achievements of Dubna scientists at the Flerov Laboratory of Nuclear Reactions in the field of superheavy elements synthesis. A press conference for the city mass media crowned the visit.

**On 20–21 January**, Ambassador Extraordinary and Plenipotentiary to Mongolia to RF Idehvtkhehn Doolonzhin with his spouse and the Embassy Minister-Counsellor Banzragch Samdan came to Dubna on a visit. Chief of the Department of International Relations of JINR D. Kamanin, Vice-Director of the Frank Laboratory of Neutron Physics Professor D. Sangaa, and top specialist of the Department of International Relations M. Loshchilov received the guests. The participants of the meeting discussed new trends of JINR–Mongolia cooperation, in connection with the implementation of the megaproject NICA/MPD at JINR, as well as a number of urgent issues that concerned the CP session.

A video conference was held **on 25 January** for Dubna, Minsk, Geneva, and Hamburg. Initiated by the Minister of Education of the Republic of Belarus, S. Maskevich, the video conference considered issues of cooperation of universities and scientific centres of Belarus with JINR, CERN, and DESY in the experiments ATLAS and CMS at the LHC, and the development of CERN- and JINR-based educational programmes.

The Belarussian side was represented by S. Maskevich, Rector of the Belarussian State University (BSU) S. Ablameiko, Director of the National Centre of High Energy Particle Physics (NCHEPP) of BSU N. Shumeiko, Director of the Scientific Research Institute of Nuclear Problems of BSU V. Baryshevsky, a group of representatives of Grodno University headed by the Rector E. Rovda, and young scientists from NCHEPP. JINR was represented by Chief Scientific Secretary N. Russakovich; CERN by I. Golutvin, A. Zarubin (the CMS collaboration), Assistant to Director-General M. Savino; DESY by W. Lohmann.

In the discussions, the participants paid their attention to the development of the school curriculum in physics for the teachers from Member States of CERN and JINR, and active involvement of Belarussian school teachers in this programme.

A meeting of JINR Director V. Matveev with leaders of national groups of staff from JINR Member States was held **on 26 January** at the International Conference Hall. For V. Matveev it was the first time he took part in such a regular meeting of national groups' leaders. The participants of the event introduced themselves to the Director, and he, in his turn, stressed the importance of tackling and solving the issues of work and accommodation of JINR staff members from the Member States as a vital prerequisite for the development of the Institute.

A number of issues had been prepared as a list of tasks to be given to the Director. In addition, the following leaders of the national groups took the floor: A. Kovalík (Czechia), G. Adam (Romania), Yu. Kulchitsky (Belarus), and W. Kleinig (Germany). JINR Vice-Director M. Itkis, JINR Chief Scientific Secretary N. Russakovich, Chairman of the meeting of the national groups' leaders W. Chmielowski (Poland), and Chief of JINR Accommodation Administration V. Skitin took part in the discussion.

The third Session of the Joint Coordinating Committee (JCC) on ARE–JINR cooperation was held **on 7–10 February** in El Quseir, Egypt.

The JINR delegation was headed by JINR Vice-Director R. Lednický and included Chief of the Department of International Relations D. Kamanin, FLNP Deputy Director V. Shvetsov, and ICD Coordinator of the JINR–ARE cooperation E. Pryanichnikova. On the Egyptian side, the session was attended by Professors T. Hussein and N. Sweilam of Cairo University, Professor Hussein El-Samman of the University of Menofia, and Professor Mohamed Ezzat Abd El-Azim, former President of the Egyptian Atomic Energy Authority (EAEA).

Attention of the third session of the Joint Coordinating Committee on ARE–JINR Cooperation was focused on the results of the first year of cooperation in joint research projects. Both sides highly appreciated the attained results and agreed on assignment of funding for the projects in 2012. The Committee started two new

projects in experimental nuclear physics and approved the subject area and budget of the upcoming 4th Practice for Young Scientists from Egypt at JINR. Both sides expressed interest in attracting the Russian Foundation for Basic Research and the Egyptian Science and Technology Development Fund to financing of the cooperation.

In the framework of the Committee session, the JINR delegation and EAEA representatives considered the possibility of concluding a new agreement on the EAEA–JINR cooperation, acknowledged the tasks formulated in the Protocol on the Collaboration of 1993 as complete, discussed a draft of a new Agreement, and determined promising areas of joint research projects.

A delegation of the French Embassy in the Russian Federation headed by the Advisor for Science, Technology and Space, Jean-Marie Fressinet, visited JINR **on 15 February**. For all members of the delegation it was the first visit to Dubna.

JINR Director Academician V. Matveev spoke about big projects of JINR and active cooperation with French centres in Grenoble, Saclay, and Orsay. M. Itkis, R. Lednický, and N. Russakovich spoke to the guests about JINR basic facilities and the research at them, and about successful involvement of JINR in international collaborations. Detailed information on participation of JINR staff members in the development of the SEZ «Dubna» was reported by A. Ruzaev.

The sides discussed possible prospects for cooperation, in particular, opportunities to integrate French physicists into JINR's megascience project NICA, issues of training young staff, exchange of young scientists — students and postgraduates, and the information support of these activities. The guests had excursions to the Veksler and Baldin Laboratory of High Energy Physics, the Flerov Laboratory of Nuclear Reactions, and the Dzhelapov Laboratory of Nuclear Problems.

The 22nd regular meeting of the Coordinating Committee on the implementation of the Agreement on cooperation between the German Federal Ministry of Education and Research (BMBF) and JINR was held at JINR **on 23–24 February**. The German delegation was headed by the Director-General for the BMBF Department «Large Research Infrastructures, Energy and Basic Research», Dr. Beatrix Vierkorn-Rudolf, and included representatives of the German physics centres DESY and GSI, and the Embassy of Germany in RF.

The meeting of the Committee was held on background of the recently signed prolongation of the agreement with BMBF for 2012–2014. The regular contribution of Germany and its distribution for grants were approved. The German side showed its interest in the NICA project and involvement of young German scientists in annual summer practice courses. The Protocol of the meeting also included achievements of JINR in its main projects: NICA, IBR-2M, DRIBs-III, the Institute grid infrastructure. It stressed the high efficiency of spending funds at JINR.

A concluding Protocol was signed on 24 February at the JINR Directorate. One of the major decisions of the Committee was the necessity to organize a special workshop on analysis of the development strategy of collaboration between scientists of Dubna and scientists of Germany in late February 2013 in Hamburg, before the next meeting of the Coordinating Committee on cooperation. The guests from Germany visited laboratories of the Institute.

**On 26 March**, JINR celebrated its Establishment Day. A delegation of the Embassy of the Socialist Republic of Vietnam in RF, headed by Ambassador Extraordinary and Plenipotentiary Pham Suan Shon, took part in the festive events. At the meeting in the International Conference Hall, JINR Director Academician V. Matveev and members of the JINR Directorate discussed prospects of the development of cooperation among scientists from Vietnam and Dubna in the main trends of JINR activities. They also talked about training of young Vietnamese specialists, where JINR could be involved, for the construction of an atomic power station in Vietnam. The Vietnamese delegation was acquainted with the studies in heavy ion physics and with experimental facilities of the Flerov Laboratory of Nuclear Reactions.

**On 28–29 March**, Days of the Czech Republic were held at the Joint Institute for Nuclear Research. The event was attended by representatives of 20 high-technology companies from Czechia and the Czech export bank, Czech ministries and agencies, the Embassy of Czechia in Moscow, as well by leaders of the scientific centres of Czechia that collaborate with Dubna.

Addressing the audience in his opening speech, JINR Director Academician V. Matveev marked that the attraction of science-intensive Czech companies to the solution of first-priority tasks of JINR would boost the general level of projects implementation and provide for most efficient expenditure and use of most modern energy-saving technology. Ambassador Extraordinary and Plenipotentiary of the Czech Republic to RF P. Kolář underlined that progress implies advancement, and businessmen and scientists ought to contact closely to produce new equipment and tools for research.

The implementation of JINR large-scale projects to develop and upgrade home accelerator fleet requires modern technology, equipment and instrumentation from JINR Member States. The managers of Czech leading companies should cooperate with leaders and staff members of JINR, and define more accurately the interests, needs and advantages of the mutually beneficial partnership. A bright example of such successful and long-standing partnership relations is the production of vacuum equipment, blocks and systems in the company «Vacuum Prague» that are used at JINR accelerators. Director of the company P. Hedbávný made a presentation «An Example of Successful Long-Standing Cooperation with JINR in Science and Technology» at the opening ceremony of the Days of Czechia at JINR.

A representative of the Ministry of Industry and Trade of the Czech Republic R. Šula talked to the audience about specialization and recent development of the companies that took part in the event at JINR.

Leaders of JINR laboratories Professors V. Kekelidze, S. Dmitriev and A. Belushkin made reports on projects to develop and upgrade the basic JINR facilities — the accelerator complex NICA, the DRIBs-III complex of radioactive ions, and the IBR-2M reactor, which are a good launching ground to apply high-tech products of Czech companies.

On 29 March, a round-table discussion was held at the JINR International Conference Hall, where representatives of Czech companies and scientific research institutions made brief reports, JINR laboratories' representatives made presentations on prospects of cooperation and involvement in projects. Financial schemes of produce delivery, administrative and organizational forms of JINR Member States' involvement in these projects were also discussed. D. Kozlenko (FLNP, JINR) and E. Syresin (DLNP, JINR) spoke about the projects that could be interesting both to Czech colleagues and to representatives of science-intensive industry, and about cooperation with institutes and enterprises of the Czech Republic.

Poster displays on the produce of Czech companies were organized at the JINR Scientists' Club and the International Conference Hall. Czech businessmen visited JINR laboratories and the technology-innovation special economic zone «Dubna».

**On 2 April**, Rector of Plovdiv University «Paisii Hilendarski» Z. Kozludjova and associate professor of the chair of atomic physics of Plovdiv University V. Cholakova visited JINR. They met with the JINR Directorate members, visited laboratories and physics facilities, and toured around Dubna.

Plovdiv University was founded in 1961 and is today the largest university in South Bulgaria and the second university after Sofia University «St. Kliment Ohridski» in the scope of faculties. Nineteen thousand students study at 9 departments: 4 natural science and mathematics departments and 5 humanities departments. There is also a department for foreign students who wish to study the Bulgarian language.

JINR Vice-Director R. Lednický and VBLHEP Deputy Director Yu. Potrebenikov spoke to the guests about the history of JINR, leading physics projects, and scientific achievements. The sides discussed prospects for further scientific cooperation.

**On 2–5 April**, meetings of the bilateral panel on Poland–JINR cooperation were held in Kraków (Poland). JINR was represented by its Director V. Matveev, Vice-Director M. Itkis, Assistant Director V. Katrsev, FLNP Director A. Belushkin, and leader of the Polish group of JINR staff members W. Chmielowski. The Polish side was represented by Plenipotentiary of the Government of Poland to JINR M. Waligórski, Professors M. Budzyński, W. Nawrocik,

R. Sosnowski, and representatives of the National Atomic Energy Agency of Poland. They discussed joint scientific programmes and activities of the Plenipotentiary of the Government of Poland on grants.

The delegation from JINR visited the Institute of Nuclear Physics and the Jagiellonian University, discussed with concerned scientists and specialists the prospects for the development of nuclear medicine, including proton therapy, and issues of possible involvement of JINR scientists and specialists in the development of a 1.5-GeV source of synchrotron radiation that is financed by the European Union.

The international forum «Innovations. CIS. Future» was held in Dubna on **4-5 April**. About 100 participants from Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Uzbekistan, Ukraine, and different organizations of the European Union arrived at the meeting. The task of the Forum was to unite efforts in the development of innovation processes in CIS, organize a working group, exchange the experience, and outline further steps in constructing a model of innovation management in the post-Soviet environment.

The Cultural Counsellor of the Embassy of the Arab Republic of Egypt in the Russian Federation, Professor Osama El-Serwy, accompanied by his wife, and the President of the Egyptian Students Group in RF, Moustafa Elbouz, visited JINR on **1 June**. The guests participated in the closing ceremony of the 4th Practice for young researchers from Egypt at JINR, which had been held in the JINR University Centre from 14 May to 1 June 2012. The Counsellor listened with interest to reports of students which they prepared after three weeks of the Practice in the framework of educational research projects at JINR Laboratories, and handed them certificates of successful finishing of the Practice.

On the JINR side, the guests were welcomed by JINR Chief Scientific Secretary N. Russakovich, FLNR Senior Researcher and Dean of the Faculty of Natural Sciences and Engineering of the University «Dubna» A. Denikin, and ICD Coordinator of the JINR-ARE cooperation E. Pryanichnikova. The guests visited the Flerov Laboratory of Nuclear Reactions and saw the sights of Dubna.

**In early June**, cities and scientific centres of the Czech Republic held Days of JINR. A delegation of JINR Directorate representatives and leading scientists of the Institute arrived in Czechia from Dubna to take part in the events.

The ceremony of opening the Days of JINR was held on 31 May in the Hall «Karolinum» of the Charles University. JINR Director Academician V. Matveev made a report «JINR and the Czech Republic: Past, Present and Future». The JINR Vice-Director spoke in his report about the programme of nuclear physics at the Flerov Laboratory of Nuclear Reactions: the synthesis of superheavy elements and studies of isotopes

of proton- or neutron-rich nuclei that are located far from the stability line, the DRIBS project for research with radioactive beams, and the project of a superheavy elements factory. Director of the Veksler and Baldin Laboratory of High Energy Physics V. Kekelidze reported about the status of activities in the NICA/MPD project, the obtained results and a new physics programme that includes two directions: one is the study of matter in extreme conditions, quark-gluon plasma, and phase transitions, and the other is spin physics. Director of the Frank Laboratory of Neutron Physics A. Belushkin made a report about the research programme at the upgraded reactor IBR-2. Chairman of the Scientific Council of the Institute of Nuclear Physics in Řež W. Wagner spoke about the research conducted by Czech scientists at the Nuclotron in the field of transmutation of nuclear wastes and opportunities to generate neutrons with high-energy proton beams.

Later in the day, a meeting of Dubna scientists and engineers with representatives of Czech companies was held in the Academy of Sciences of the Czech Republic. The sides discussed opportunities of application of technological achievements of the enterprises interested in coming to Dubna. In particular, they discussed possible ways to produce vertex detectors. Czech specialists had developed a considerable part of the vertex detector of the ATLAS experiment. The enterprise «ON Semiconductor» was awarded an industrial prize for the excellent quality of the detector and was eager to share the production experience at other facilities. The participants of the meeting also discussed the issue of involvement of Czech companies in the construction of the NICA collider, as well as in equipment deliveries and assembling.

The Dubna delegation visited the high-tech enterprise «Vacuum Prague». This company has been supplying vacuum equipment to Dubna for many years. It took part in the development of detectors installed inside the LHC. Another excursion for the guests from Dubna was organized to the machinery plant «ŠKODA-Plzeň» that produces equipment for nuclear power stations. The guests from JINR discussed with the plant managers the issue of supply of the vacuum chamber for the new cyclotron at FLNR and possible supply of a movable reflector for IBR-2.

Two agreements were signed: between the company «Vacuum-Prague» and the JINR Dzhelepov Laboratory of Nuclear Problems on cooperation in the framework of the Hamburg programme for development of a powerful source of synchrotron radiation; and between JINR and INP (Řež). A meeting of JINR representatives with the Czech Deputy Minister of Education, I. Wilhelm, who is a Co-Chairman of the Scientific Council of JINR, was held at the Czech Ministry of Education, Youth and Sport that supervises cooperation with Dubna. Czech journalists attended the meeting.

Thereby, the Days of JINR in the Czech Republic made it possible to inform the public about the wide

range of research in Dubna — from radiobiology and nuclear physics to high energy physics, about upgrading and development of basic facilities, as well as the ideas that these scientific studies reach Czech companies which take part in these projects and develop new technologies and increase their competitiveness.

Ambassador Extraordinary and Plenipotentiary of the Swiss Confederation to Russia P. Helg, Counselor of the Embassy and Head of Economic Affairs and Science Department J. Derron, and Science and Technology Officer of this department A. Melnikov visited the Joint Institute for Nuclear Research **on 13 June**. JINR Director V. Matveev, JINR Vice-Director M. Itkis, JINR Chief Scientific Secretary N. Russakovich, Chief of the JINR Department of International Relations D. Kamanin informed the guests about JINR scientific activities, the development of international cooperation, including cooperation with the European Organization for Nuclear Research.

The Swiss diplomats were acquainted with scientific research at JINR laboratories. Assistant to DLNP Director on innovative projects E. Syresin spoke about the cyclotron of the Belgian company IBA, which would be the basis for a cancer treatment complex in Russia. FLNR Deputy Director A. Popeko acquainted the guests with the programme on the synthesis and research of superheavy elements, development of the accelerator and experimental complexes of the Laboratory. VBLHEP Director V. Kekelidze devoted his report to the Nuclotron/NICA accelerator complex, one of the megascience projects in Russia. At VBLHEP, the guests visited detector laboratories, where O. Fateev and V. Peshekhonov spoke about products of these laboratories.

Coordinator of JINR–Serbia cooperation agreement from the Serbian side S. Petrović (the Vinča Institute of Nuclear Sciences, Belgrade) visited JINR **on 13–23 June**. S. Petrović participated in the regular meeting of the Programme Advisory Committee for Condensed Matter Physics. On 18 June, he visited JINR laboratories and, accompanied by Coordinator of JINR–Serbia cooperation agreement from the JINR side D. Kamanin, was received by Ambassador Extraordinary and Plenipotentiary of the Republic of Serbia to RF Mrs. J. Kurjak. A protocol which extends current joint scientific research projects of this year was signed on the results of joint work.

**On 21–22 June**, a meeting of the Machine Advisory Committee on the accelerator part of the NICA project was held in Dubna. Leading experts in accelerator physics from largest nuclear physics centres of the world, such as FAIR, FNAL, BNL, CERN, GSI, FZJ, attended the meeting. Reports were presented on the Nuclotron upgrading and various ways of developing an accelerator complex, in particular: the launch of an injector complex, an ion source, the construction of

the booster and collider, and a number of its systems. The members of the Committee examined the technical areas of the facility, discussed the status of activities, and gave their expert judgement and recommendations.

According to the conclusions of the meeting and the general opinion of the experts, it is essential for Russia to develop such a large-scale project as it will promote the development not only of science but also of the accompanying high-tech technology and new production decisions.

An official ceremony was held **on 21 June** to open a video portal dedicated to the Joint Institute for Nuclear Research: it contains documentaries, video clips and TV news (go to <http://science-tv.jinr.ru>). The video portal has been developed by staff members of the Scientific Information Department of JINR, with the assistance of the personnel from the Laboratory of Information Technologies and the TV channel «Dubna».

The aim of the video portal was to popularize scientific research, attract the attention of young people to big interesting projects and facilities, to demonstrate scientific achievements of JINR and the level of studies. The chapter «Video Archive» contains about 50 films and programmes about outstanding scientists of JINR, basic facilities, techniques and technology acknowledged worldwide. In the chapter «Media» you can find lectures, interviews and programmes about modern projects produced mainly by the state television channels. In the news pages the items about JINR are placed before they are on air in the local television. It is achieved due to the new structure of broadcasting events about the Institute in the video format.

The 11th meeting of the Joint Coordinating Committee on RSA–JINR cooperation was held in Dubna **from 25 to 27 June**. RSA was represented by General Director of the Department of New Research Trends and Infrastructure D. Adams, Director of the Infrastructure Department Ch. Mokonoto, Coordinator of the RSA–JINR educational programmes N. Jackobs, department head of the Laboratory iThemba LABS S. Mullins, and Professors from universities that cooperate with JINR. On the JINR side, M. Itkis, D. Kamanin, A. Vodopianov, F. Šimkovic, V. Shvetsov, and O. Matyukhina took part in the meeting. The participants discussed issues of development of cooperation between JINR and RSA scientific centres. The guests from the Republic of South Africa visited JINR laboratories.

**On 27 June**, Head of the Federal Agency for the Commonwealth of Independent States, Compatriots Living Abroad and International Humanitarian Cooperation («Rossotrudnichestvo») K. Kosachev and Head of the Department of Science and Technical and Innovative Cooperation of Rossotrudnichestvo A. Chernyshov were welcomed at the JINR Directorate by JINR Director RAS Academician V. Matveev, JINR Vice-Director

Professor M. Itkis, Director of the International Innovative Nanotechnology Centre of the CIS countries A. Ruzaev, Chief of the JINR Department of International Relations D. Kamanin, JINR Director Advisor G. Kozlov, and Social Infrastructure Management Office Director A. Tamonov. JINR Director V. Matveev spoke to the guests about the milestones in JINR achievements and large-scale scientific projects under implementation that are based on wide international cooperation, and about specific opportunities in the development of innovation activities.

The main result of the visit was signing of an Agreement about cooperation between the Federal Agency for the Commonwealth of Independent States, Compatriots Living Aboard and International Humanitarian Cooperation and the Joint Institute for Nuclear Research, aimed at extension of cooperation of the parties in scientific-technical, innovative and scientific-educational spheres: from organization of joint scientific, applied and topical conferences, seminars, exhibitions, educational programmes to development of cooperation of the CIS countries in the field of implementation of results of scientific-technical activity in knowledge-intensive industries of economy, including personnel training, and also in establishing and support of market launch of innovative products, including those in the framework of the Interstate Programme of Innovative Cooperation of the CIS countries for the period until 2020.

**On 26–28 July**, a representative delegation of Vietnamese scientists and science organizers visited JINR. It was headed by President of the Academy of Sciences and Technology of Vietnam (ASTV) Professor Chau Van Minh.

On 27 July, JINR Director Academician V. Matveev, JINR Vice-Director Professor M. Itkis, Deputy Chief Scientific Secretary V. Bednyakov, Chief of the JINR Department of International Relations D. Kamanin, leading researcher of JINR VBLHEP N. Zimin, and Head of the national group of Vietnamese staff members of JINR Nguyen Manh Shat received the guests at the JINR Directorate. Academician V. Matveev spoke about the activities of the Institute, stressing the fact that an active part in the development of the Institute was played by leading Vietnamese scientists Academicians Nguyen Van Hieu, Nguyen Din Ty, and many others. V. Matveev also indicated milestones of JINR–Vietnam cooperation and talked about modern achievements in the development of cooperation between JINR and Vietnam. The Institute Director and his colleagues answered the questions which the guests asked them about the structure of the Institute, its educational programme, and innovation activities.

Having introduced his colleagues, Professor Chau Van Minh spoke about activities at ASTV. He noted the contribution of JINR to the development of the Vietnamese science and training of several generations of scientists since the Institute foundation. The ASTV

President pointed out that the cooperation with JINR would continue to be a key issue of the foreign policy of the Academy of Sciences and Technology of Vietnam.

Director of the Institute of Physics Nguyen Dai Hung, Director of the Institute of Environmental Technology Nguyen Hoai Chau, Director of the Institute of Technology Research and Application Bui Minh Ly, and Deputy Director of the Institute of Marine Biochemistry Nguyen Hoai Nam spoke about scientific trends developed by Vietnamese scientists. Special attention was paid in the discussions to the issues of education of scientific youth from Vietnam at JINR postgraduate courses and participation of Vietnamese specialists in innovation programmes of JINR.

The guests from Vietnam informed the JINR Directorate about a new scientific and educational centre of ASTV in Nhatrang. In particular, this centre is meant for schools on nanotechnology, information technology and other priority topics where scientists, specialists and young scientists of JINR will be involved.

Then the delegation from Vietnam visited the JINR UC and had a meeting with its director S. Pakuliak.

The guests also visited the laboratories where they were informed on R&D in the main projects of the Institute. Finally, the guests were shown the special economic zone «Dubna».

The decree of **30 July 2012**, signed by RF President V. Putin, announces that the RF Presidential Council on Science, Technology and Education is reorganized into the RF Presidential Council on Science and Education. Deputy Director of JINR VBLHEP RAS Corresponding Member G. Trubnikov has become a member of the Council Presidium, along with leading Russian scientists and science organizers.

**On 31 July**, Ambassador Extraordinary and Plenipotentiary of the Republic of Poland to RF W. Zajączkowski and Counsellor of the Embassy K. Kordasz visited JINR. At the JINR Directorate they were received by JINR Director V. Matveev, JINR Vice-Director M. Itkis, JINR Chief Scientific Secretary N. Russakovich, and the leader of Polish staff members of JINR W. Chmielowski.

V. Matveev talked to the guests about refurbishment of JINR basic facilities. In particular, he said that the general contractor was planned to be chosen for the NICA project, and all JINR Member States were informed about this by their Plenipotentiaries. W. Zajączkowski informed the leaders of JINR about improvement of the situation connected with the membership of Poland at the Joint Institute and expressed his hope that this question would be positively solved.

JINR Vice-Director M. Itkis invited the Ambassador of Poland to the ceremonial meeting on the occasion of inauguration of two new elements of the periodic table, flerovium and livermorium, to be held in the Moscow House of Scientists on 24 October. N. Russakovich spoke to the guests about the steps taken by JINR to

enter European scientific structures. In this connection, V. Matveev gave an example of the partnership between JINR and CERN which is based on mutual interests of both centres and bilateral agreements of cooperation signed by them.

The Polish diplomats showed much interest in the opportunities for education of young people at JINR: participation in JINR–CERN schools for physics teachers, in summer international practice courses in JINR research trends, including the studies that Polish staff members of JINR conduct in various laboratories of the Institute.

**On 3 August**, an Agreement was signed on cooperation between JINR and JSC Instrument Works «Tensor». The aim of the Agreement is to join the efforts of the two organizations and their capacities for efficient implementation of high-technology projects, on the basis of the scientific and technical potential of the Joint Institute for Nuclear Research and industrial capacities of the plant «Tensor». JINR Director RAS Academician V. Matveev and General Director of JSC «Tensor» V. Golubev signed the Agreement. Both institutions were included in the cluster on nuclear-physics and nanotechnology as the city of Dubna had won the competition for state support. The experience accumulated at «Tensor» in the manufacturing of specialized testing equipment for protection of nuclear hazardous facilities will enrich the potential of JINR. The JINR Director accepted the invitation of the «Tensor» General Director to become acquainted with the industrial complex of the Works.

Chairman of the State Duma of the RF Federal Assembly S. Naryshkin visited Dubna **on 28 August** to become acquainted with scientific achievements at JINR and innovation projects at the «Dubna» SEZ.

During his visit to JINR, the Chairman of the State Duma was informed on the NICA project. Director of the Institute Academician V. Matveev spoke to the guest about the large-scale upgrading efforts that would allow the construction of a new accelerator complex on the basis of the well-known Synchrotron. The heavy-ion collider, a modern physical set-up, will be the core of the new complex.

VBLHEP Deputy Director A. Vodopianov spoke to the guest about the scientific programme of the NICA project. Head of the Accelerator Department of the Laboratory A. Butenko talked about prospects to irradiate electronic equipment at the Nuclotron for space vehicles. For this purpose, it is planned to develop a stationary set-up. The participants of the meeting also discussed JINR's cooperation with Germany in the development of the FAIR accelerator.

A traditional souvenir was presented to S. Naryshkin on the occasion of his visit to the Laboratory — a piece of polished copper winding from the Synchrotron.

A delegation from the German Federal Ministry of Education and Research (BMBF), headed by Director-General for the BMBF Department «Large Research Infrastructures, Energy and Basic Research» and Chairperson of the European Strategy Forum on Research Infrastructures (ESFRI) Dr. B. Vierkorn-Rudolf, visited the Joint Institute for Nuclear Research **on 29–31 August**. She was accompanied by Head of the Science and Education Department of the German Embassy C. Heinz and Professor C. O. Kester (GSI, Darmstadt).

The German delegation was welcomed by JINR Director Academician V. Matveev. Possible scenarios of GSI–JINR cooperation were discussed. During an excursion to the Veksler and Baldin Laboratory of High Energy Physics, the German guests were acquainted with progress in the development of the NICA project and detectors for this accelerator complex.

The first memorandum governing interaction on the projects FAIR and NICA was signed on 31 August. JINR Director Academician V. Matveev called it a historic moment that demonstrated the positive changes concerning international attitude to the NICA project.

**On 26 September–5 October**, JINR Chief Scientific Secretary N. Russakovich and head of LIT sector O. Chuluunbaatar attended festive events dedicated to the 70th anniversary of the Mongolian State University (MonSU) held in Ulaanbaatar (Mongolia). N. Russakovich handed a greeting address to the leaders of the University and presented the Diploma of the title «Honorary Doctor of JINR» to Academician T. Zhanlav, graduate of the Mongolian State University, for his contribution to cooperation and training of young scientists.

Since its foundation in 1942, the Mongolian State University has trained dozens of thousands of specialists in most in-demand trends of science and technology. Academician N. Sodnom, graduate of MonSU of 1946, was elected thrice JINR Vice-Director, served as Plenipotentiary of the Government of Mongolia to JINR and member of the Scientific Council. Other MonSU graduates, Academicians B. Chadraa, S. Ehnkhat, N. Galbaatar, Professors D. Chultehm, Ts. Gantsog, O. Otgonsuren, D. Sangaa, B. Nehrguj, and many others made a considerable contribution to science, cooperation and development of JINR.

N. Russakovich had a meeting with the newly appointed Plenipotentiary of the Government of Mongolia to JINR, Director of the Centre for Nuclear Research at MonSU Professor S. Davaa, MonSU President Professor S. Tumur-Ochir, and Head of the Atomic Energy Agency of Mongolia N. Tehgshbayar. The sides discussed issues of the development of cooperation in education and research, and the question of increasing Mongolia's fee at JINR, according to the scale.

On the occasion of the 70th anniversary of MonSU, Director of JINR's LIT V. Korenkov was awarded the State Prize of Mongolia — the Badge of Honour «Lead-

ing Worker of Science», for his service in training young highly skilled specialists in computer science.

**On 27–28 September**, a delegation from Hungary visited JINR. It was headed by Vice-Director of the National Administration of Innovations L. Korányi. The delegation included Counsellors of the Embassy of Hungary in Moscow A.J. Erdélyi, D.M. Palásthy, Adviser on science from the Wigner Research Centre for Physics L.D. Nagy, and representatives of Hungarian organizations and enterprises who are interested in cooperation with Dubna. A poster exhibition and a display of the products of Hungarian firms were organized in the International Conference Hall. The guests from Hungary took part in the work of the JINR Scientific Council, met with leaders of the Institute, and discussed issues of cooperation in science and high technology. They also visited JINR laboratories.

On 28 September, a plenary meeting of the round-table discussion on JINR–Hungary cooperation was held in the Scientists' Club. JINR Director V. Matveev and Vice-Director of the Hungarian National Administration of Innovations L. Korányi greeted the participants. JINR's FLNP Director A. Belushkin and Adviser on science of the Wigner Research Centre for Physics L.D. Nagy spoke about the contribution of Hungarian scientists to the development of the Joint Institute and about modern trends in cooperation. The managers of Hungarian hi-tech firms informed the participants about their science-intensive products, while JINR specialists spoke about scientific and innovation projects that represent mutual concern for cooperation. The sides signed Letters of Intent.

**On 27–30 September**, a delegation from Mongolia visited JINR. It included leading staff member of the Department of International Cooperation of the Agency on Nuclear Energy (ANE) in the Government of Mongolia Sh. Munkh-Ochira, senior staff member of the ANE Department of Nuclear Technology B. Batgehrhla, head of sector of the Nuclear Research Centre of the Mongolian State University (NRC MonSU) Professor G. Khuukhehkhuu, head of sector of NRC MonSU Professor N. Norov, and researcher Tsehmbehlmaa.

The guests from Mongolia took part in the session of the Scientific Council and were informed about the education programmes at the University Centre of JINR. At the meeting with UC Director S. Pakuliak and Dean of the Department of Natural and Engineering Sciences of the «Dubna» University A. Denikin, the guests discussed issues of the development of cooperation in training and education of Mongolian holders of the master's degree and post-graduates, participation of young people from Mongolia in practical and theoretical courses, and other activities of the JINR UC. Accompanied by FLNP Deputy Directors D. Sangaa and V. Shetsov, the del-

egation had a visit to the IBR-2 reactor and the experimental hall at the Frank Laboratory of Neutron Physics.

**On 29 September**, a festive event was held in the territory of the JINR DLNP site: the alley named after Academician of the Academy of Sciences of Poland, Professor of the Institute of Nuclear Physics (Krakow) Jerzy Janik was ceremonially opened. As FLNP Director A. Belushkin said, the scientific career of this outstanding Polish scientist was inseparably associated with the Joint Institute for Nuclear Research. Plenipotentiary of the Republic of Poland to JINR M. Waligórski talked about the milestones of the scientist's biography. FLNP staff member I. Natkaniec noted that it was due to the suggestion made by J. Janik that the pulsed neutron source, first meant only for studies in nuclear physics, became later a perfect tool for research in condensed matter physics. Today, hundreds of users in the world express their intention to conduct experiments on it.

A delegation from the Taiwan mission in Moscow, headed by Director of the Department of Science and Technology Mr. Wu Shu-yi, visited the Joint Institute for Nuclear Research **on 17 October**. The guests were welcomed at the JINR Directorate by JINR Vice-Director Professor R. Lednický, JINR Chief Scientific Secretary N. Russakovich, Chief of the Department of International Relations D. Kamanin, and head of LIT sector E. Ayryan. Issues of enhancing scientific and technical cooperation and promotion of involvement of Taiwanese scientists and specialists in JINR activities were discussed. The Taiwan delegation visited Veksler and Baldin Laboratory of High Energy Physics and was acquainted with progress in the NICA project.

A delegation from JINR, consisting of V. Voronov, I. Golutvin, D. Kamanin, V. Korobov, and V. Shvetsov, participated in ceremonial events dedicated to the 40th anniversary of the Institute for Nuclear Research and Nuclear Energy (INRNE) **on 18–19 October** in Sofia.

Director of INRNE D. Tonev opened the celebration ceremony with a report about the history and current development of the Institute. Numerous congratulatory addresses stressed the fact that, along with great past and present of the Institute, INRNE has bright prospects for the future. The representatives of JINR presented D. Tonev a congratulatory address.

An international scientific seminar was held in the framework of the jubilee celebration. Its participants gave reviews of the international cooperation at INRNE most widely influenced by JINR and CERN. Deputy Chairman of the Nuclear Regulatory Agency of Bulgaria L. Kostov received the JINR delegation. The sides discussed urgent issues of Bulgaria's involvement in JINR activities.



**On 24 October**, a grand ceremony was held at the Central House of Scientists (CHS) of the Russian Academy of Sciences. It was organized on the occasion of the official acknowledgement of the discovery of two new chemical elements with atomic numbers 114 and 116 that were synthesized in Dubna, and giving them the names «flerovium» (Fl) and «livermorium» (Lv) in the Mendeleev periodic table.

Leaders of the International Union of Pure and Applied Chemistry (IUPAC), representatives of JINR, the Lawrence Livermore National Laboratory (USA), and other leading world research centres that study the synthesis of superheavy elements, as well as ambassadors and officials from embassies of JINR Member States, representatives of the Russian Academy of Sciences, federal ministries, the Mayors of Dubna and Livermore gathered in the great hall of CHS for the event.

JINR Vice-Director M. Itkis opened the ceremony. Scientific Leader of the Flerov Laboratory of Nuclear Reactions Academician Yu. Oganessian made a brief review of the history of the research in the field of the synthesis of superheavy elements. IUPAC President Professor K. Tatsumi ceremonially declared the names of the new elements. Leaders of laboratories from France, Germany, the USA that conduct research in the synthesis of new elements and representatives of RAS took the floor and congratulated scientists on the occasion. As Academician S. Aldoshin said, a new bright page had been written into the history of the world science, being a breakthrough in nuclear physics and nuclear reactions physics that gave a tremendous impetus to new studies and experimental research by world scientists.

Mayor of the city of Livermore D. Marchand highly estimated the outstanding scientific results and presented memorial letters to Academician Yu. Oganessian, RAS Vice-President S. Aldoshin, and Dubna Mayor V. Prokh.

Ambassador Extraordinary and Plenipotentiary of the Slovak Republic to RF J. Migaš, accompanied by the First Secretary of the Slovak Embassy P. Zengő and Director of the company «STM Power a.s.» S. Králik, visited the Joint Institute for Nuclear Research **on 15 November**. JINR Director V. Matveev, JINR Vice-Directors M. Itkis and R. Lednický, Chief Scientific Secretary N. Russakovich, Chief of the JINR Department of International Relations D. Kamanin, and Director of the Flerov Laboratory of Nuclear Reactions of JINR S. Dmitriev participated in the meeting on the JINR side.

The participants of the meeting discussed further cooperation of the Slovak Republic with JINR on completion of construction of the Cyclotron Centre of the Slovak Republic in Bratislava based on the DC-72 cyclotron developed at FLNR of JINR. Ambassador J. Migaš reported about a forthcoming session of an intergovernmental board of the Russian Federation and the Slovak Republic, where a discussion of construction of the Cyclotron Centre would be among priority issues. He highly appreciated the expert commentary of JINR in all areas related to the conclusion of the required decisions. JINR Director V. Matveev expressed readiness to send JINR specialists to assist in finishing the installation of the accelerator equipment. After the negotiations, the Slovak delegation was shown the accelerator complex of FLNR.

**On 19 December**, a delegation of the Embassy of Japan in Russia visited JINR. It included Attache on science Kodzi Kamitani and Assistant of the Technological Administration Department Yuko Tsuda.

At the JINR Directorate, the guests were received by Vice-Director R. Lednický, Chief Scientific Secretary N. Russakovich, Chief of the Department of International Relations D. Kamanin, Deputy Director of the Veksler and Baldin Laboratory of High Energy Physics Yu. Potrebenikov, and staff member of the Department of International Relations A. Kotova. The aim of the visit was to become acquainted with JINR and prospects for its further development, the megaproject NICA, and to discuss issues of cooperation between JINR and Japanese scientific centres.

The guests were impressed by educational opportunities at JINR, experience and plans of JINR in hadron therapy. Prospects of construction of the International Linear Collider were also discussed.

The JINR leaders suggested that chances for further cooperation with Japanese research centres should be discussed, with an account of considerable growth in the scientific exchange for the last decade and a wide range of mutual interests among scientists. Primarily, it should be the involvement of Japanese scientists in the NICA project. The guests were shown the Nuclotron/NICA accelerator complex at the Veksler and Baldin Laboratory of High Energy Physics.

By the Order of RF Prime Minister D. Medvedev **of 20 December** 2012, RF Minister of Education and Science D. Livanov was appointed Plenipotentiary of the Government of the Russian Federation to the JINR Committee of Plenipotentiaries.

## CONFERENCES AND MEETINGS HELD BY JINR

Twelve conferences were the largest among the scientific conferences and workshops held at JINR in 2012.

The workshop «*Classical and Quantum Integrable Systems*» was held at the Bogoliubov Laboratory of Theoretical Physics on 23–27 January. The meeting is a continuation of the series of workshops organized for the first time at the Institute of High Energy Physics (Protvino) at the beginning of the 1980s. Traditionally, the workshops were held in Protvino, Dubna, and Chernogolovka.

This time, more than a hundred scientists from JINR Member States, the USA, Great Britain, Germany, France, Japan, and South Korea participated in the Workshop. The programme of the Workshop included advanced methods for integrable systems and related symmetries; specific integrable models in classical and quantum mechanics, statistical physics, and the theory of stochastic processes; 2d, 3d and 4d (super)conformal field theories and dualities.

Ordinary and supersymmetric conformal field theories in the spaces of small dimension and dualities of the corresponding models were the central topics of the discussions related to the well-known AdS/CFT correspondence and the interrelations between 2d and 4d conformal field theories, known as the Alday–Gaiotto–Tachikawa (AGT) correspondence. Reports on the AGT correspondence were given by A. Belavin and M. Bershtein. Other aspects of 2d CFT and Liouville theory were considered in the talks of L. Chekhov, M. Olshanetsky, A. Semikhatov, and G. Tarnopolsky. Various properties of supersymmetric models were described by V. Kazakov (4d,  $N = 4$  super-Yang–Mills theory and relation to the  $Y$ -systems), E. Ivanov ( $N = 4$  Landau model), A. Gorsky (4d supersymmetric QCD and a cyclic renormalization group). Mathematical aspects of the mirror symmetry were discussed by D. Orlov.

A special session was devoted to superconformal indices of the four-dimensional gauge field theories and their relation to the elliptic hypergeometric integrals, the ordinary and hyperbolic  $q$ -hypergeometric functions.

Various aspects of the theory of spin chains, their physical and mathematical properties were presented by A. Bytsko, K. Malyshev, V. Pasquier, E. Ragoucy, N. Slavnov, A. Zabrodin, A. Zhedanov, and others. Connections of stochastic processes and random surfaces with integrable systems were considered in detail in the talks of A. Povolotsky, V. Poghosyan, and S. Solodukhin. Classical integrable systems were discussed in the talks of A. Marshakov, A. Orlov, and G. Helmink. The representation theory of classical and  $q$ -deformed Lie algebras and superalgebras was discussed by E. Feigin, D. Lebedev, A. Mudrov, and V. Tolstoy.

The Workshop was supported by JINR, RFBR, «Dynasty» Foundation, the «Journal of Physics A», and the International Association of Mathematical Physics.

On 31 January–3 February, JINR hosted the 19th international interdisciplinary conference «*Mathematics. Computing. Education*» (MCE). The MCE conferences are held annually on a regular basis during winter students' holidays in the scientific centres near Moscow, Russia — either at LIT of the Joint Institute for Nuclear Research (each even year) or at the Biology Research Centre of RAS, Pushchino (each odd year).

The Conference is organized by the Joint Institute for Nuclear Research (Dubna) in cooperation with the Dubna University, the Lomonosov Moscow State University, the Pushchino Scientific Centre of RAS, the Keldysh Institute for Applied Mathematics (Moscow, the Russian Academy of Sciences), and the interregional public organization «Women in Science and Education».

The Conference participants listened to reports by famous JINR researchers: JINR Director Academician V. Matveev, «Scientific Programme of the JINR Development»; LIT Director V. Ivanov, «Information Technologies in Research at JINR»; LIT Deputy Director V. Korenkov, «GRID Technologies and Cloud Computing in Russia and at JINR»; and Professor V. Nikitin, «High Energy Physics and Megaproject NICA».

Great interest of the Conference attendees was attracted by presentations devoted to the applied development delivered by A. Rats, «Innovative Development of Dubna», and M. Sapozhnikov, «Detector of Explosives and Drugs». The talks contributed by DLNP Director A. Olshevski («Prospects of the Development of Nuclear Medicine») and LRB Director, Corresponding Member of RAS E. Krasavin («Accelerated Multi-Charged Ions as a Tool for Solving Fundamental and Applied Problems of Radiation Biology») were dedicated to the issues of medical development at JINR.

The lecture «Innovative Approaches to the Professional Training at Dubna University» presented by Professor E. Cheremisina, Director of the Institute of System Analysis and Management of the University «Dubna», was of particular interest for high-school teachers and lecturers, as well as for the majority of the participants involved in the pedagogical process.

The talk given by I. Pospelov, a Corresponding Member of RAS, was devoted to the questions of simulations in the Russian economics. A number of aspects of modern economics were discussed in the reports by Doctors of Economics, Professors A. Varshavsky and V. Livshits (Central Economic Mathematical Institute, RAS). Particular interest was caused by a lecture of Professor A. Fridmann (CEMI, RAS) «The World Diamond Market and Russia».

Some sections were devoted to a detailed professional discussion of the issues of mathematical modeling in different areas of knowledge and a teaching technique in various disciplines at school and higher school. Master classes on remote training and cloud computing were organized by the University «Dubna».

A special session was dedicated to the FOROS project (Formation of the all-Russian Educational Space) in the framework of which remote joint seminars on the scientific creativity of pupils from different Russian cities were organized. The teachers and directors of these schools talked about the project, and high-school students presented their reports. Alongside with the traditional natural-science and educational sections, gender and museum sections were also organized.

The 19th MCE Conference aggregated more than 380 participants, two thirds of them being young people. The young participants of the workshop, organized within the MCE-19, «Analysis of Complex Biological Systems: Models and Experiment» heard lectures presented by Corresponding Member of RAS and Head of the Department of Biophysics of MSU Biological Faculty Professor A. Rubin and Head of the Sector of Molecular Evolution of the Institute of Problems of Information Transfer of RAS G. Bazykin on modern spectral methods in ecological biophysics and systems biology. Besides, they took part in master classes on mathematical simulation in biophysics and presented their oral reports and posters.

The Conference participants listened to Yu. Nechiporenko's wonderful emotional lecture about M. Lomonosov, dedicated to the 300th anniversary of his birth. They participated in a memorial session devoted to the memory of participants who had passed away: writer Z. Zhuravleva and Professor A. Loskutov (MSU). They also visited a presentation of the House of Russia Abroad in the culture centre «Mir» and a concert at the JINR Scientists' Club. A round-table session «Women's Organizations, Their Role in Education and Enlightenment» was organized in the House of Veterans in cooperation with Dubna women's organization «Stimula».

On 6–11 February the 16th scientific conference «AYSS-2012» worked at the Laboratory of Information Technologies. It is annually organized by the Association of Young Scientists and Specialists of JINR during winter students holidays and devoted to the main trends of research at JINR. Students, postgraduates, young scientists and specialists of the Institute and scientific centres of Russia take part in it.

This year, the Conference tackled the issues of mathematical support of physics research held at the Institute and other research centres in cooperation with Dubna. In the framework of the Conference, leading scientists from JINR, MSU, MPTI, the Institute of Mathematics and Mechanics (Yekaterinburg, Russia), Frankfurt University (Germany), and Yerevan

State University (Armenia) presented a cycle of lectures on cutting-edge topics in these fields, including urgent issues of mathematical simulation in experimental physics, biophysics, and modern methods of high-performance calculations. Nine thematic sections were open during the Conference, where young scientists from JINR made their reports.

On behalf of the Directorate, JINR Chief Engineer G. Shirkov opened the Conference and stressed the fact that this year the Conference would start a series of events for the youth, including a school for young scientists in Alushta, meetings in Yerevan, competitions of scientific papers, in particular those oriented for grant issuing to most active scientists of JINR.

LIT Director V. Ivanov mentioned that training of young specialists in information technologies is organized at the Laboratory on a regular level: from a large number of students, best graduates are selected to take postgraduate courses, and some of them continue their work at the Laboratory of Information Technologies. He gave the first lecture at the conference «Information Technologies in Research at JINR».

The Conference was traditionally concluded with a competition for JINR Prizes for the youth. In the nomination for scientific theoretical research, the second prize was awarded to A. Andreev, A. Gusev, and A. Novikov. For scientific experimental research, the first prize was awarded to Yu. Vinogradova and O. Samoilov. For scientific methods study and scientific-technical research, the first prize was awarded to N. Anfimov, the second to R. Eremin, M. Zhabitsky; the encouragement prize was awarded to G. Filatov. For scientific-technical applied research, the first prize was awarded to K. Panferov, the second to S. Kichanov and N. Kutovsky.

On 14–18 May, the third school on information technologies «*Grid and Advanced Information Systems*» was held under the auspices of the Joint Institute for Nuclear Research and the European Organization for Nuclear Research. The organizers were the JINR Laboratory of Information Technologies and a group for the development of modern information systems in the CERN Basic Infrastructure Division. The purpose of the School is to share the knowledge gained and being expanded at JINR and CERN in the field of modern information technologies for the manpower development.

The third school, «Grid and Advanced Information Systems», was devoted to the issues of control over sophisticated scientific complexes and information systems with the technologies developed at JINR and CERN as an example. Students from the leading institutions of higher education of Moscow and Moscow Region attended the event: MEPI, MIPT, MPEI, Bauman State Technical University in Moscow, Dubna University, as well as students from the University of Science and Technology in Krakow, Poland. The participants heard lectures on the program languages Groovy,

Grails, Java, as well as on databases, Grid technologies, cloud computing, electronic libraries, flexible development of software using Scrum, the NICA accelerator complex, and experiments on the LHC: CMS, ATLAS, etc. Leading specialists of JINR and CERN delivered their lectures to the School attendees. Also an excursion to the NICA accelerator complex was organized.

To conclude the School, a round-table session was held with participation of the School Chairman Professor N. Russakovich, Co-chair J. Ferguson, and MEPI pro-rector B. Onykyi, where the students took a chance to share their impressions about the School and put forward their suggestions and wishes.

On 6–19 June the *2012 European School of High Energy Physics* was held in Anjou, France (formerly the CERN–JINR School on Physics). It was jointly organized by the European Organization for Nuclear Research (CERN), Geneva, Switzerland, and the Joint Institute for Nuclear Research (JINR), Dubna, together with IN2P3 and CEA, France.

The scientific programme of the School included 32 reports on the following topics: Field Theory and the Electroweak Standard Model (J. Iliopoulos, ENS Paris, France); Electroweak Symmetry Breaking (theory versus data) (R. Rattazzi, EPFL Lausanne, Switzerland); QCD at Colliders (L. Dixon, SLAC, USA); Flavour Physics and CP Violation (G. Isidori, INFN Frascati, Italy); SUSY (D. Kazakov, JINR); Other Physics beyond the Standard Model (G. Servant, CERN and IPHT Saclay, France); Neutrino Physics (G. Barenboim, University of Valencia, Spain); Heavy-Ion Physics (U. Wiedemann, CERN); Practical Statistics for Particle Physicists (H. Prosper, Florida State University, USA); LHC Results Highlights (G. Rolandi, CERN); Cosmology (P. Binetruy, APC, France).

Seminars were held each day in the afternoon. Students took an active part in them. Discussion leaders were A. Arbuzov (JINR), J.-B. de Vivie de Régie (LAL Orsay, France), A. Gladyshev (JINR), G. Moreau (LPT, Orsay University, France), M. Pierini (CERN), and J.-C. Winter (CERN). Many students made their poster presentations at the seminars during the first week of the School.

On 17 June – 5 July, students, postgraduates and young scientists from Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tadjikistan, Uzbekistan, and Ukraine took part in the 5th anniversary CIS higher training courses «*Synchrotron and Neutron Research of Nanosystems and Materials (SYN-nano)*», held in Dubna and Moscow.

The organizers of this already traditional youth forum were the National Research Centre «Kurchatov Institute» (NRC «Kurchatov Institute»), the Joint Institute for Nuclear Research (JINR), and the RAS Institute of Crystallography under the support of the Intergovernmental Foundation for Education, Scientific and Cultural Cooperation of CIS Member States (IFESCCO)

and the Ministry of Education and Science of the Russian Federation.

This year the courses were opened with a three-day conference of 50 graduates of the previous courses held in 2008–2011. The opening ceremony of the conference took place on 18 June in the NRC «Kurchatov Institute» in Moscow. All invited graduates presented their oral and poster reports on the next two days at JINR in Dubna. The meeting was concluded with a round-table session. Some of the former participants of the courses have already scientific contacts with the Joint Institute for Nuclear Research and come to Dubna for collaborative work and trainings.

The first week of the courses was held traditionally at JINR in Dubna. The mornings were busy with lectures on neutron scattering, synchrotron and X-ray radiation for study of nanosystems and new materials, and review lectures about scientific projects to be implemented at the JINR accelerator complex. In the afternoon, the students had practice at neutron spectrometers at the modernized IBR-2M pulsed reactor at the Frank Laboratory of Neutron Physics, JINR. The participants were familiarized with the JINR user policy and proposal service system for IBR-2M users. The second week of the courses took place in laboratories of the Kurchatov Centre of converging, nano-, bio-, information and cognitive sciences (Kurchatov NBIC Centre) and the Joint Use Centre of the Institute of Crystallography in Moscow.

The 6th international conference «*Nuclear Structure and Related Topics*» (NSRT12) was held at the Bogoliubov Laboratory of Theoretical Physics on 3–7 July. More than 120 participants from 19 countries of Europe, Asia, North and South America, and Africa took part in NSRT12. About one third of them were from the JINR Member States — Russia and East European countries. A sizable number of nuclear physicists came from Germany, France, and Italy. Chinese nuclear theorists showed great interest in NSRT12 as well. Quite interesting results were brought to Dubna by physicists from Brazil, India, and South Africa. The Conference was supported by the Russian Foundation for Basic Research and the Heisenberg–Landau, Votruba–Blokhintsev, and Bogoliubov–Infeld Programmes.

The programme of NSRT12 consisted of several subject areas which more or less equally attracted attention of the Organizing Committee and the Advisory Committee. Every area included both theoretical and experimental talks.

The Conference started with the report by Professor M. Itkis about recent achievements and future plans in studies of superheavy elements at the Flerov Laboratory of Nuclear Reactions, JINR. Both the report and the subsequent discussion were stimulated by the recent decision of IUPAC to approve the names «flerovium» and «livermorium» for elements 114 and 116, synthesized

in Dubna by FLNR physicists in collaboration with the Lawrence Livermore National Laboratory (USA). Then the discussion of superheavies was continued in the talk by S. Heinz (GSI) and theoretical report by Professor G. Giardina (Messina University).

In most of the theoretical contributions treating nuclear structure problems, the approaches based on different variants of energy density functional were used. Among the nuclear properties under discussion, one could find the basic nuclear characteristics, like masses, shapes or potential energy surfaces, as well as the spectroscopic properties — excited state energies, electromagnetic moments, etc. In several talks, different aspects of pairing correlation theory were discussed.

Quite unexpected data on electromagnetic characteristics of low-lying quadrupole mixed-symmetry states in selected rare-earth nuclides were presented by physicists from the Technical University of Darmstadt. Appreciable attention was given to nuclear fission. The results of experimental studies of collinear cluster tripartition (or true ternary fission) at JINR were discussed. An interesting talk was given by Dr. P. Thirolf (Munich University). The talk was devoted to perspectives of photofission studies at the ELI-NP facility with a brilliant monochromatic  $\gamma$  beam, being constructed in Bucharest.

Interesting results were presented in reports on the physics of light exotic nuclei. Experimentalists of FLNR have found the low-lying isovector dipole mode in  ${}^6\text{Be}$  and sorted out a low-lying part of the excitation spectrum of the  ${}^{10}\text{He}$  nucleus. From the reports of Brazilian scientists, it became known about the RIBRAS facility at the University of São Paulo for investigations of reactions with beams of light radioactive nuclei, as well as about theoretical studies in the same subject area. Moreover, excited states in halo nuclei were discussed and, specifically, the existence of the rotational band built on the Hoyle state in  ${}^{12}\text{C}$  was debated.

The theorists of BLTP gave talks on mechanisms of heavy-ion collisions, nuclear fission, and charge-exchange giant resonances. On the whole, the Conference programme included about 60 invited talks and presentations, and 17 posters.

On 16–21 July, the JINR Laboratory of Information Technologies (LIT) hosted an international conference *«Distributed Computing and Grid Technologies in Science and Education»*.

It was the fifth conference held by LIT on this subject held every other year, under the support of the Russian Foundation for Basic Research. Each time it involves more and more specialists. The programme of the Conference included not only the questions related to the development and operation of Grid infrastructures and Grid applications, but also some theoretical and practical aspects of utilizing distributed computing environments, distributed data processing, etc. This

time, a growing interest in the Conference was aroused by the development in Russia of a Tier-1 level data-processing centre at JINR and at the NRC «Kurchatov Institute», as well as by vigorous activity in applying the so-called cloud computing.

The Conference was attended by 256 participants from 22 countries: Azerbaijan, Belarus, Bulgaria, China, Cuba, the Czech Republic, France, Georgia, Germany, Great Britain, Italy, Kazakhstan, Moldova, Mongolia, Myanmar, Romania, Russia, Sweden, Switzerland, Ukraine, the USA, Uzbekistan, as well as from the international research centres CERN and JINR. Russia was represented by participants from 40 universities and research centres.

The Conference programme included daily plenary sessions and eight sections: Grid Infrastructures, Clouds and Grid, Grid Applications, Desktop Grids, Systems of Distributed Information Resources, WLCG (Worldwide LHC Computing Grid), GridNNN (Grid of the National Nanotechnology Network), Distributed Computing (methods and algorithms), as well as poster presentations.

Plans to develop a centre for processing and storing LHC data of the Tier-1 level in Russia gathered in Dubna representatives of numerous Tier-1 centres who shared their operation experience. According to the computing model for LHC, the Tier-1 level centres are charged with a long-term storage and accumulation of experimental data, and provision of other centres of the same or lower level with these data. That is why so much attention was paid to the data storage systems.

The section «Clouds and Grid» was the most representative. It reflected great interest aroused by cloud computing, comparison of this direction with Grid and visualization.

A workshop on computing for the ATLAS experiment on the LHC, chaired by the leader of computing for ATLAS experiment A. Klimentov (BNL, USA/CERN), was organized in the framework of the Conference.

The International Desktop Grid Federation (IDGF) Tutorial was held in the framework of the Conference in combination with a practical part in this direction. Introduction to grid technologies was continued for students, postgraduate students, and Conference participants from Mongolia and Azerbaijan.

A round-table discussion devoted to the development of a Tier-1 level data processing centre for LHC experiments in Russia became an important event of the Conference. The work to set up this centre is being carried out by the NRC «Kurchatov Institute» and JINR on the basis of a state contract.

The international conference-school for young scientists *«Modern Problems of Applied Mathematics and Computer Science»* was held at the JINR Recreation Centre «Ratmino» on 22–27 August under the

auspices of the National Committee of the Society for Industrial and Applied Mathematics (SIAM) and the International Coordination Committee for Computational Mathematics of the CIS Academies of Sciences.

The Conference was organized by the Keldysh Institute of Applied Mathematics of RAS, the JINR Laboratory of Information Technologies, the Institute of Numerical Mathematics of RAS, and the Research Computer Centre of MSU, with the purpose to restore the traditions of schools for young scientists which used to be held in the former USSR on applied mathematics and mathematical modeling.

The main goal of this Conference-School was the acquaintance of young scientists, students and postgraduate students with modern computational methods, tools and methods of programming, computing platforms, as well as with the results of mathematical modeling of various systems in science and technology. A peculiar feature of the event was not only the acquaintance of young scientists with present-day computing methods developed for the solution of applied tasks with modern high-performance computing systems, but also presentation of short reports on the results of their studies.

The conference was attended by more than 120 participants from Russia, Belarus, Bulgaria, Germany, Mongolia, Slovakia, South Africa, Tajikistan, Ukraine, and Vietnam. Russia was represented by participants from Dubna, Moscow, Voronezh, Yaroslavl, Sarov, and Novosibirsk.

Seventeen lectures were delivered at the Conference, while young scientists, students and postgraduates presented 47 oral reports and 10 posters. The delivered lectures gave a detailed picture of the modern level of the development of applied mathematics and informatics, allowed one to evaluate the breadth of the spectrum of challenges, organize a fruitful exchange of opinions among the scientists, and even take a little look into the future.

The decision to consider the Conference-School an important element of the scientific and educational programme in the field of applied mathematics and computer science was approved, and it was marked that the Schools should be held on a regular basis (every two years).

The traditional 21st international Baldin seminar on problems of high energy physics «*Relativistic Nuclear Physics and Quantum Chromodynamics*» was held at the Veksler and Baldin Laboratory of High Energy Physics on 10–15 September.

The Seminar has been organized every other year since 1969. The interest in the event has grown much lately. This year, reports from practically all leading centres of high energy physics of the world were presented. Obviously, the latest results obtained at the Large Hadron Collider at CERN aroused much interest. The predictions made by A. Baldin more than 15 years ago on asymptotic behaviour of nuclear in-

teractions at high energies have been brilliantly proved and this fact deserves a special mentioning. For example, the experimental data on the ratio of antiprotons yield to that of protons, obtained at the LHC at an energy of up to 7 TeV, excellently matched the curves that A. Baldin and his colleagues had obtained before.

The nuclear cumulative effect, predicted by A. Baldin and discovered at the JINR Laboratory of High Energies in the early 1970s, has become once again topical and urgent. A lot of reports at the Seminar discussed this phenomenon. It is planned in the future to conduct new experiments for detailed studies of the properties of fluctuations in nuclei.

As usual, many reports delivered at the Seminar were devoted to studies of structure functions of hadrons and nuclei, relativistic theory of nucleon–nucleon interactions, search for quark–gluon plasma, and modern interpretation of experimental data obtained lately in various physics centres. Proposals for new experiments were discussed.

Relativistic physics opens big prospects in the applied science. Many results of these studies have already been widely used in medicine and technology. However, there are many issues that need further research. In particular, studies connected with safe nuclear energy industry and disposal of radioactive wastes with nuclear beams from accelerators are of great interest. A special section of the Seminar discussed these issues.

*The 20th International Symposium on Spin Physics* (SPIN2012), held in Dubna from 17 to 22 September, was attended by about 280 participants from 22 countries. Since the Rochester Conference in 1964, it has been the first forum that attracted so many scientists. It was approved at the meeting of the Board on Nuclear Physics C12 of the International Union of Pure and Applied Physics (IUPAP). This Symposium is one of the largest IUPAP conferences. Most participants of the Dubna Symposium were from JINR, the USA, Russia, Germany, Japan, and Italy. The programme of the Symposium included six plenary sessions, at which 32 invited talks were presented and discussed, and nine sections with 145 presentations devoted to the spin structure of hadrons, spin effects in reactions with lepton and hadron beams, spin physics beyond the Standard Model, future experiments, as well as to the technique of polarized beams and targets, and application of spin phenomena in medicine and technology.

Of the future projects, the Nuclotron-M/NICA project should be mentioned. Its programme is able to bring the Institute to prominence in investigations of spin phenomena. The spin community of the Symposium supported the plans to develop new unique possibilities for conducting polarization studies at the accelerator complex of the JINR VBLHEP. The obtained data will help to solve the puzzles of the spin effects that have had no solution since the seventies of the last

century. JINR Director V. Matveev announced an open competition for the position of the leader of the NICA spin programme.

Of great impression is the JLab programme on increase in the energy of a continuously circulating electron beam of their accelerator up to 12 GeV and upgrading of most of the detectors to carry out a cycle of experiments on generalized structure functions. This Laboratory also considers potentialities for construction of a collider of electrons with protons and nuclei accelerated up to 250 GeV. A 10–30 GeV electron accelerator is also planned at BNL for collision of electrons with polarized protons and RHIC nuclei, including polarized  $^3\text{He}$  nuclei for investigation of the neutron spin structure. At CERN, the project COMPASS-II has already started to study production processes of muon pairs in collisions of pions with polarized nucleons for investigation of the nucleon spin structure and deeply virtual exclusive production of photons and mesons for measuring the contribution of the orbital angular moment to the nucleon spin. Also, the programme was presented for obtaining polarized proton beams from  $\Lambda$ -particle decay at the U-70 accelerator (IHEP) for spin studies at the SPASCHARM facility being now under construction. Great interest was generated by the plans to establish in Jülich (Germany) a unique European complex for determining the electric dipole moment (EDM) of the proton and nuclei.

As always, the sources of polarized particles, physics of the acceleration of polarized beams, physics of polarimeters, and the polarized target technique were discussed at the Symposium. Of special note is the confirmation of the method of obtaining the proton beam polarization at the COSY facility using spin filtration by the polarized gas target.

Great interest was aroused by the first results of experiments at the Large Hadron Collider at CERN relating to spin physics. In particular, many discussions were focused on the role of the spin in studying the recently discovered particle with a mass of 125 GeV, which claims to be the Higgs boson, in polarization of  $W$  and  $Z$  bosons and also in heavy-quark physics.

The success of the Symposium was facilitated by the financial support from the Jefferson Laboratory, the Brookhaven National Laboratory and the RIKEN BNL Centre (USA), the Research Centre in Jülich (Germany), the Russian Foundation for Basic Research, the «Dynasty» Foundation, the JINR Heisenberg–Landau, Bogoliubov–Infeld, Blokhintsev–Votruba and Ter-Antonyan–Smorodinsky programmes of international collaboration, as well as from the scientific and industrial organizations: «Neutron Technologies», «Atom», and «CryoInnovations». They made it possible to provide considerable financial support to young participants from different countries.

The international symposium **EXON 2012** on the physics of exotic states of nuclei, one of the most

important and actively progressing fields of nuclear physics, was held on 1–6 October in Vladivostok (Russia). The event was organized by five largest scientific centres where this trend is successfully developed: the Joint Institute for Nuclear Research in Dubna, the National Centre GANIL (France), the Research Centre RIKEN (Japan), the Scientific Centre on Heavy Ion Physics GSI (Germany), and the Laboratory of Superconducting Cyclotrons (Michigan, USA). The leaders of these five principal scientific centres were co-chairmen of the Symposium Organizing Committee: RAS Academician Yu. Oganessian (JINR), Professors S. Galès (GANIL), H. En'yo (RIKEN), H. Stöcker (GSI), and K. Gelbke (USA). The Symposium discussed the results of the latest experimental and theoretical studies on the synthesis and properties of nuclei far from the stability region — from very light to superheavy elements.

130 scientists from 24 countries of the world took part in EXON 2012. Delegations from Russia, Germany, France, Japan, and the USA were the most impressive. Three participants from South Africa were gladly welcomed at the Symposium. The Russian research centres were represented by 28 participants.

The scientific programme included invited reports on urgent trends of exotic nuclei physics and new projects at largest accelerator complexes and experimental facilities. In total, about 80 oral presentations and 40 poster reports were made. The participants discussed the results of the latest experiments on the synthesis and studies of properties of nuclei of new superheavy elements. Interesting results were obtained in joint JINR FLNR – GSI (Germany) – the P. Scherrer Institute (Switzerland) experiments on chemical identification of elements 112 and 114 at the beams of the FLNR cyclotron U-400. A bright example of this collaboration is the experiment on the synthesis of element 117, carried out jointly with scientists from US laboratories who provided target material of  $^{249}\text{Bk}$ . The inauguration ceremony of elements 114 and 116 discovered in Dubna and named flerovium and livermorium was held in Moscow in October 2012.

Many interesting results obtained recently and discussed at the Symposium concerned those produced in the studies of the weakly bound nuclei interaction, such as  $^6\text{He}$ ,  $^8\text{He}$ ,  $^6\text{Li}$ ,  $^{11}\text{Li}$ , etc. The phenomenon of the subbarrier fusion of nuclei was discovered, and the effect of cross-section gain of transfer reactions was obtained in the subthreshold energy region. Theoretical reports gave interpretations of these results. For the first time, experimental results on the search of resonance in the  $^7\text{H}$  system were reported at the meeting. These experiments are conducted at FLNR, JINR, and the new results obtained in them show a promising outlook for the reactions with weakly bound nuclei to get information on the nucleon stability borders in the region of very light elements. Experimental data were presented on the search of the tetra-neutron ( $^4n$ ),  $^6\text{H}$ ,

$^7\text{H}$ , and  $^{10}\text{He}$  obtained in different scientific centres. Reports made by staff members of GANIL, GSI, MSU, and RIKEN had much new information on the properties of nuclei near the nucleon stability borders.

One day in the Symposium agenda was devoted to the issue of the present situation and future prospects of accelerator complexes for heavy ions and radioactive nuclei in leading scientific centres of the world. The five laboratories that are the Symposium co-organizers are developing a new generation of accelerators that will make it possible to advance considerably in the

synthesis and studies of the properties of new exotic nuclei. The projects SPIRAL, RIKEN, FAIR, DRIBs, NICA, and RIBF were presented by the spokespersons. As such large-scale projects can be implemented only through joint efforts of leading scientific centres of the world, a most important issue of the Symposium agenda was the discussion of opportunities for various collaborations to develop physical facilities and the elaboration of joint scientific programmes. It was actually the main task of the meeting and explained the support rendered by leading scientific centres.

## PARTICIPATION OF JINR IN INTERNATIONAL CONFERENCES

In 2012, JINR scientists and specialists participated in 334 international conferences.

The largest delegations representing JINR attended the following events: CBM meeting (Darmstadt, Germany); ITEP winter school (Moscow, Russia); the PINP winter school (Roshchino, Russia); the international school on theoretical physics «Prospects of Particle Physics» (Schladming, Austria); the NUSTAR workshop (Darmstadt, Germany); the International Workshop on Shape-Phase Transitions and Critical-Point Phenomena in Nuclei (Darmstadt, Germany); the international conference «Ecological Chemistry» (Chisinau, Moldova); PANDA collaboration meeting (Darmstadt, Germany); the PINP School on Physics of Condensed Matter (Roshchino, Russia); the ASRC international workshop «Perspectives in Nuclear Fission» (Tokai, Japan); the CBM collaboration meeting (Darmstadt, Germany); the international conference «Parallel Computational Technologies» (PCT'2012) (Novosibirsk, Russia); the International Workshop on Hadron Structure and Spectroscopy (Lisbon, Portugal); the Conference of Young Scientists, Specialists and Students devoted to the Cosmonautics Day (Moscow, Russia); the all-Russian conference «Information and Telecommunication Technologies and Mathematical Modelling of High-Tech Systems» (Moscow, Russia); the international conference «Polynomial Computer Algebra 2012» (St. Petersburg, Russia); the Central European Training School on Neutron Scattering (CETS 2012) (Budapest, Hungary); the ENSAR-ECOS Workshop on Future Super-Heavy Element Strategy (FUSHE 2012) (Erbismuehle-Weilrod, Germany); the All-Russian Conference on Problems of Particle Physics, Plasma and Condensed Matter Physics, and Optoelectronics (Moscow, Russia); the European Radioactive Ion Beam Conference (EURORIB'12) (Padova, Italy); the Workshop on Drell–Yan Scattering and the Structure of Hadrons (Trento, Italy); the Rencontres de Blois «Particle Physics and Cosmology» (Blois, France); the Ginzburg Conference on Physics (Moscow Russia); the

Russian–Ukrainian seminar «Few-Body Problem with Strong and Coulomb Interactions» (Kiev, Ukraine); the Workshop on Meson Production, Their Properties and Interactions (MESON 2012) (Cracow, Poland); the International Workshop on Radiation Damage to DNA (Prague, Czech Republic); the International Conference on Neutrino Physics and Astrophysics (Kyoto, Japan); the International Seminar on High Energy Physics (Quarks 2012) (Yaroslavl, Russia); the Workshop on CBM Dipole Magnet (Darmstadt, Germany); the International Workshop on Nuclear Spectroscopy and Structure of Atomic Nucleus (Nucleus 2012) (Voronezh, Russia); the International Workshop on Polarized Neutrons in Condensed Matter Investigations (PNCMI 2012) (Paris, France); the Balkan School on Nuclear Physics (Blagoevgrad, Bochinovo, Bulgaria); the European Cosmic Ray Symposium (ECSR 2012) (Moscow, Russia); the International Conference on High Energy Physics (ICHEP2012) (Melbourne, Australia); the international workshop «Hadron Structure and QCD: From Low to High Energies» (HSQCD'2012) (Gatchina, Russia); the Light Cone Conference (LC2012) (Cracow, Poland); the conference «Nuclear Structure and Dynamics» (NSD2012) (Opatija, Croatia); the international conference «Geophysical Exploration 2012» (Dubna, Russia); the International Workshop on Symmetry in Integrable Systems (SIS'12) (Yerevan, Armenia); the Symposium on Nuclear Physics and Astrophysics (Lenzkirch-Saig, Germany); the Russian school-seminar «Modern Problem of the Theory of Gravity and Cosmology» (GRACOS-2012) (Kazan–Yalchik, Russia); the international conference «Current Problems in Nuclear Physics and Atomic Energy» (NPAE-Kyiv2012) (Kiev, Ukraine); the Symposium on European Strategy for Particle Physics (Cracow, Poland); the PANDA collaboration meeting (Paris, France); the International Conference on Cryogenics (Cryogenics 2012) (Dresden, Germany); the European Nuclear Physics Conference (EuNPC 2012) (Bucharest, Romania); the International Seminar on



Electromagnetic Interactions in Nuclei (EMIN-2012) (Moscow, Russia); the International Conference on Clustering Aspects of Nuclear Structure and Nuclear Reactions (Debrecen, Hungary); the CBM collaboration meeting (Kolkata, India); the All-Russian Particle Accelerator Conference (RuPAC 2012) (St. Petersburg, Russia); the international conference «Models of Quantum Field Theory» (Peterhof, Russia); the international conference «Nuclear Science and Its Application» (Samarkand, Uzbekistan); the international conference on «Quark Confinement and the Hadron Spectrum» (Munich, Germany); the Meeting and Youth School on the Use of Neutron Scattering in Condensed Matter Research (Zelenogorsk, Russia); the all-Russian scientific conference «Digital Libraries: Perspective Methods and Technologies, Digital Collections» (RCDL'2012) (Pereslavl-Zalesskiy, Russia); the international conference for young scientists «Experimental and Theoretical Biophysics» (Pushchino, Russia); the National Congress of the Italian Society for Space Biomedicine and Biotechnology (ISSBB 2012) (Brindisi, Italy); the Meeting on the NICA Project (Frankfurt, Germany); the Belarussian Mathematical Conference (Minsk, Belarus); the Scientific Session-Conference of the Nuclear Physics Section of the Physical Sciences Division of the Russian Academy of Sciences (Moscow, Russia); the PANDA collaboration meeting (Darmstadt, Germany).

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### DEVELOPMENT OF THE JINR INTERNATIONAL COLLABORATION AND RELATIONS OF THE YEAR 2012

1.	Number of short-term visits to JINR by specialists from Member States (not counting Russian specialists)	1322
2.	Number of visits of specialists from other countries, including visits of specialists from the associated countries	989 517
3.	Number of visits by JINR specialists to Member States	1098
4.	Number of visits to international conferences and research centres of other countries, including visits to the associated countries	1695 656
5.	Number of conferences, schools, and meetings held by JINR	90
6.	Number of JINR fellows	18
7.	New cooperation agreements (memorandums of understanding), addendums to existing ones	12

### LIST OF CONFERENCES AND MEETINGS HELD BY JINR IN 2012\*

No.	Name	Place	Date	Number of participants
1.	22nd Session of the Joint Committee on the IN2P3–JINR Collaboration	Paris, France	12 January	6
2.	Session of the Programme Advisory Committee for Condensed Matter Physics	Dubna	16–17 January	63
3.	Session of the Programme Advisory Committee for Particle Physics	Dubna	23–24 January	70
4.	International conference «Classical and Quantum Integrable Systems»	Dubna	23–24 January	112
5.	Session of the Programme Advisory Committee for Nuclear Physics	Dubna	26–27 January	70
6.	19th international conference «Mathematics. Computer. Education»	Dubna	30 January – 4 February	360
7.	10th Winter School on Theoretical Physics	Dubna	30 January – 6 February	60
8.	Meeting of the JINR Scientific and Technical Council	Dubna	2 February	60

\*A number of conferences were held jointly with other organizations. JINR also took part in holding the teleconference on 4 July: CERN–JINR teleconference bridge.

No.	Name	Place	Date	Number of participants
9.	16th Conference of Young Scientists and Specialists (AYSS-2012)	Dubna	6–11 February	131
10.	3rd Session of the ARE–JINR Joint Coordinating Committee	Hurghada, Egypt	7–13 February	8
11.	111th Session of the JINR Scientific Council	Dubna	16–17 February	150
12.	Coordination Meeting on Implementation of the BMBF–JINR Agreement	Dubna	23–24 February	22
13.	Conference (road-show) «CIS: Partnership in Innovations»	Kiev, Ukraine	12–14 March	300
14.	6th Internship of CIS Young Scientists	Dubna	18 March – 17 April	19
15.	Meeting of the JINR Finance Committee	Dubna	23–24 March	90
16.	Session of the Committee of Plenipotentiaries of the Governments of the JINR Member States	Dubna	26–27 March	100
17.	Round Table on Cooperation between JINR and the Czech Republic	Dubna	28–29 March	111
18.	16th research workshop «Nucleation Theory and Applications»	Dubna	1–30 April	60
19.	Bilateral NICA/JINR–FAIR workshop «Structure of Matter at Highest Baryon Densities in Laboratory and Space»	Frankfurt, Germany	2–4 April	37
20.	International forum «Innovations. CIS. Future»	Dubna	4–5 April	64
21.	ARE Students Practice	Dubna	13 May – 3 June	24
22.	3rd CERN–JINR school on information technologies «Grid and Advanced Information Systems»	Dubna	14–18 May	105
23.	5th Spring School on Nuclear Physics	Blagoevgrad (Bachinovo), Bulgaria	14–18 May	60
24.	20th International Seminar on Interaction of Neutrons with Nuclei (ISINN-20)	Alushta, Ukraine	21–26 May	90
25.	Meeting of the JINR Scientific and Technical Council	Dubna	24 May	60
26.	CMS workshop «Perspectives on Physics and on CMS at Very High Luminosity, HL-LHC»	Alushta, Ukraine	28–31 May	92
27.	Workshop of the BAIKAL collaboration	Dubna	29 May – 1 June	53
28.	Days of JINR in the Czech Republic	Prague, Czech Republic	30 May – 2 June	110
29.	Conference of Young Scientists and Specialists (Alushta'12)	Alushta, Ukraine	4–9 June	51
30.	International workshop «Generation of Neutron Fields in Relativistic Nuclei with Large- $Z$ Targets and Their Use in the Transmutation and Energetics»	Prague, Czech Republic	4–8 June	17
31.	European School on High-Energy Physics (a CERN–JINR school)	La Pommeraye, France	6–19 June	130
32.	5th Upper-Level Courses on Nanotechnologies for CIS Young Scientists	Dubna	17–21 June	110

No.	Name	Place	Date	Number of participants
33.	International workshop «Relativistic Nuclear Physics: From Hundreds of MeV to TeV»	Stara Lesna, Slovak Republic	17–23 June	70
34.	20th international colloquium «Integrable Systems and Quantum Symmetries»	Prague, Czech Republic	17–23 June	70
35.	Session of the Programme Advisory Committee for Condensed Matter Physics	Dubna	18–19 June	65
36.	Session of the Programme Advisory Committee for Nuclear Physics	Dubna	21–22 June	70
37.	NICA Machine Advisory Committee Meeting	Dubna	21–22 June	16
38.	School for Teachers of Physics from JINR Member States	Dubna	24–30 June	58
39.	Session of the Programme Advisory Committee for Particle Physics	Dubna	25–26 June	71
40.	Guest Session of the RAS Department of Physiology and Fundamental Medicine	Dubna	27–28 June	50
41.	International workshop «Few-Body Systems» (FBS-2012)	Dubna	27–29 June	49
42.	Advanced Studies Institute «Symmetries and Spin» (the 28th International Meeting on Spin Research Programme)	Prague, Czech Republic	1–8 July	85
43.	Second Stage of the International Student Practice	Dubna	1–22 July	94
44.	International conference «Nuclear Structure and Related Topics»	Dubna	3–7 July	98
45.	12th International Baikal School on Elementary Particle Physics and Astrophysics (JINR–ISU Summer School)	Bolshiye Koty, Russia	3–10 July	100
46.	4th all-Russian scientific and technical school «Future Personnel»	Dubna	3–10 July	123
47.	International conference «Dubna-Nano 2012»	Dubna	9–14 July	99
48.	5th international conference «Distributed Computing and Grid Technologies in Science and Education»	Dubna	16–21 July	256
49.	4th Helmholtz international school-workshop «Calculations for Modern and Future Colliders» (CALC-2012)	Dubna	23 July – 2 August	87
50.	Meeting of the collaboration BM@N — Baryonic Matter at Nuclotron	Dubna	31 July – 2 August	50
51.	Bilateral KLFTP/CAS–BLTP/JINR Workshop on Nuclear Theory	Dubna	3–6 August	40
52.	16th School of Young Scientists and Specialists	Dubna (Lipnya)	17–19 August	27
53.	International conference-school for young scientists «Modern Problems of Applied Mathematics and Computer Science»	Dubna	22–27 August	128
54.	International conference «Molecular Aspects of Solid State and Interfacial Electrochemistry»	Dubna	26–31 August	60
55.	Helmholtz international school «Dense Matter in Heavy-Ion Collisions and Astrophysics»	Dubna	28 August – 9 September	60

No.	Name	Place	Date	Number of participants
56.	International Summer School on Complex and Magnetic Soft Matter Systems: Physico-Mechanical Properties and Structure	Dubna	3–7 September	40
57.	Workshop of the OPERA collaboration	Alushta, Ukraine	3–5 September	60
58.	5th International Bruno Pontecorvo School on Neutrino Physics	Alushta, Ukraine	7–16 September	100
59.	3rd international school «Instruments and Methods of Experimental Physics. Electronics and Automatics of Experimental Facilities»	Dubna	9–11 September	56
60.	5th Japan–Russia workshop «Molecular Simulation Studies in Material and Biological Sciences» (MSSMBS'12)	Dubna–Moscow	10–12 September	55
61.	21st international Baldin seminar on high energy physics problems «Relativistic Nuclear Physics and Quantum Chromodynamics»	Dubna	10–15 September	169
62.	Conference on Precision Physics and Fundamental Physical Constants	Stara Lesna, Slovak Republic	10–14 September	45
63.	4th Dubna school for young scientists «Management of Innovations»	Dubna	13–16 September	93
64.	International workshop «Accelerator Facility NICA: Problems and Solutions»	Sozopol, Bulgaria	14–21 September	27
65.	ASPERA meeting	Dubna	14 September	49
66.	20th International Spin Physics Symposium (SPIN2012)	Dubna	17–23 September	268
67.	International scientific school for young scientists «Modern Neutron Diffraction Studies»	Dubna	24–28 September	61
68.	Practice for students from Belarus	Dubna	24 September – 14 October	11
69.	Practice for students from Ukraine	Dubna	24 September – 14 October	9
70.	Practice for students from South Africa	Dubna	24 September – 14 October	51
71.	Joint ISTC–CERN–JINR Summer School on High Energy and Accelerator Physics	Dubna	26 September – 3 October	59
72.	112th Session of the JINR Scientific Council	Dubna	27–28 September	150
73.	Round Table on the JINR–Hungary Cooperation	Dubna	27–30 September	71
74.	International Symposium on Exotic Nuclei (EXON 2012)	Dubna	1–6 October	114
75.	39th European Neutron Scattering Association Meeting	Dubna	7–9 October	32
76.	2nd School in the 21st Century of the JINR and IHNST Young Scientists (IHNST — the Institute of History of Natural Sciences and Technics)	Dubna	8–12 October	78
77.	6th Joint APCTP–BLTP/JINR Workshop	Pohang, Republic of Korea	8–10 October	50
78.	Workshop on MPC&A Operations Monitoring (MOM)	Dubna	15–19 October	25

No.	Name	Place	Date	Number of participants
79.	Session of the Committee of Plenipotentiaries of the Governments of the JINR Member States	Dubna	23–24 October	116
80.	International Festive Colloquium dedicated to naming the new elements with atomic numbers 114 and 116	Moscow, Russia	24 October	210
81.	15th international conference «Science. Philosophy. Religion»	Dubna	25–26 October	100
82.	2nd Seminar of the JINR Ukrainian National Group	Dubna	18–20 November	40
83.	3rd international conference «Scintillation Material Engineering and Radiation Technologies»	Dubna	20–23 November	95
84.	Meeting of the JINR Finance Committee	Dubna	20–21 November	107
85.	3rd symposium «Models and Methods in Few- and Many-Body Systems»	Stellenbosch, South Africa	27–29 November	74
86.	Workshop of the BAIKAL collaboration	Dubna	4–7 December	55
87.	Workshop of the European Research Group on Ultrarelativistic Heavy Ion Physics	Dubna	12–14 December	42
88.	Italy–France–Russia–JINR Round Table «Frontiers of Mathematical Physics»	Dubna	16–18 December	55
89.	International workshop «Problems of Supersymmetric Integrable Systems»	Dubna	24–25 December	27
90.	Meeting of the JINR Scientific and Technical Council	Dubna	27 December	60