

COLLABORATION IN SCIENCE AND TECHNOLOGY

The basic results of the international cooperation in science and technology of the Joint Institute for Nuclear Research in 2011 reflect the following data:

- joint research has been conducted with scientific centres in Member States, as well as with international and national organizations in other countries, on 40 topics of first priority and 4 topics of second priority;
- to solve cooperation issues and questions of participation in scientific meetings and conferences, the Joint Institute sent 2618 specialists;
- for joint work and consultations, as well as for participation in meetings, conferences and schools held at JINR, 1705 specialists were received;
- 48 international scientific conferences and schools, 21 workshops and 20 meetings were organized and held;
- 10 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 10–13 January, a delegation from JINR took part in the Russian–Taiwanese Symposium on Scientific Cooperation in Nuclear Research and the Development of Nuclear Medicine Methods. The Symposium was organized by the National University Tsinghua in Hsinchu (Taiwan). Review reports on JINR activities were made at the Symposium by Director of the Frank Laboratory of Neutron Physics A. Belushkin, Deputy Chief Scientific Secretary D. Kamanin, Leader of the FLNP group of small-angle scattering A. Kuklin and Deputy Director of the Dzhelapov Laboratory of Nuclear Problems E. Syresin. FLNP Deputy Director D. Sangaa also took part in the event — he arrived in Taiwan with a delegation from the Mongolian Academy of Sciences in the framework of the joint Mongolian–Taiwanese project for application of the synchrotron radiation in material studies for fuel cells.

The topics of three main sections covered studies of nanoobjects with small-angle scattering and neutron reflectometry, reactor physics and isotope production, as well as selected issues of nuclear medicine.

In the discussions with Taiwanese colleagues, JINR participants noted that 10 years of cooperation of JINR with the National Agency on research and technology of Taiwan provided a wide range of joint scientific work. Potentially, Taiwanese scientists are interested in opportunities to conduct research at JINR and send young specialists to JINR for training. The delegation from Dubna visited the National Synchrotron Research Centre of Taiwan.

A regular meeting of the joint seminar of the RDMS CMS cooperation was held **on 19 January**. The seminar leader Professor I. Golutvin stated that the meeting was timed to new observation results that concern collective effects in pp and PbPb collisions discovered in experiments at the LHC (ALICE, ATLAS, CMS) in the second half of 2010, namely, to the angle correlations (ridge-effect) and the asymmetry of the particle jets' yield.

In a lecture hall of the JINR UC a video conference was held with the Lebedev Physics Institute of RAS and the Institute for Nuclear Physics of RAS in Moscow, the Petersburg Institute for Nuclear Physics in Gatchina, the Budker Institute for Nuclear Physics in Novosibirsk, CERN in Geneva and a number of educational training centres of Barnaul, Novosibirsk, Omsk, Tomsk, Yaroslavl and other cities. The reports were accompanied by discussions where leading scientists from JINR, PIAS, INP RAS, IHEP, SRINP MSU, and PINP spoke about the urgency of more elaborate experimental measurements that provide new data on collective properties of interactions in the conditions of large multiplicity and the obvious necessity to compare the data obtained in proton and heavy-ion collisions. Only the whole complex of experimental data will allow a better understanding of the origin of these phenomena: the dependence of the observed effects on multiplicity, collision energy and the number of the initial interacting hadrons.

On 31 January, the 21st meeting of the Joint Committee on cooperation between the National Institute of Nucleus Physics and Particle Physics of France (IN2P3) and JINR was held in Dubna.

From the French side, the following representatives took part in the meeting: IN2P3 Deputy Director on Science S. Galès, IN2P3 Deputy Director on Accelerators and Nuclear Facilities A. Mueller, IN2P3 Deputy Director on Astroparticles and Neutrino S. Katsanevas and IN2P3 Coordinator of International Cooperation E. Perret. JINR was represented by Acting Director M. Itkis, Vice-Director R. Lednický, Chief Scientific Secretary N. Russakovich, Director of the Dzheltopov Laboratory of Nuclear Problems A. Olshevskiy, Director of the Flerov Laboratory of Nuclear Reactions S. Dmitriev and ICD staff member A. Belova.

The participants of the meeting noted the high level of cooperation in 2010, discussed the status and prospects of the development of priority projects implemented in IN2P3 and JINR. New projects were proposed: the effect of photon–photon coupling in non-stable nuclei and multi-component modeling of the volume charge for the second RIB line of the SPIRAL2 project. In conclusion, a list of 25 joint projects was compiled for 2011; they will be financed by IN2P3 and JINR. Both sides marked wide prospects for further development of fruitful cooperation.

The forum «RSA–JINR: Five Years Together» was held **on 8–11 February** in Pretoria. A delegation from JINR that consisted of 14 leading specialists and leaders of the Institute took part in the event. It was headed by JINR Acting Director Professor M. Itkis. From the South African side, delegations from the Department on Science and Technology (DST) and the National Research Foundation (NRF), representatives of universities from Pretoria and Cape Town, the National Cyclotron Laboratory iThemba LABS and the Corporation of Atomic Energy of South Africa (NECSA) took part in the Forum. The agenda of the event included a discussion of results of the five-year cooperation and prospects for its further development. The attention of the participants was focused on the development of educational programmes, and a round-table discussion was devoted to the topic. The involvement of RSA in the NICA project was also discussed, as well as the development of other fundamental and applied research projects.

DST General Director P. Mjwara opened the Forum. DST Deputy Director M. Qhobela, who had been appointed an observer from RSA at JINR CP, greeted the delegates. The first day included complementary presentations from JINR and South African colleagues in all trends of cooperation and discussions.

The participants of the Forum highly evaluated the results of cooperation of the last five years. It was marked that the main principles of interactions did not need any revision, and there existed big opportunities

for further development of cooperation and increase of efficiency in the use of resources. The participants of the Forum came to the conclusion that joint implementation of big infrastructural projects, such as, for example, RSA involvement in the NICA/MPD project and the construction of a university cyclotron centre in RSA with JINR's participation, could considerably strengthen cooperation in both scientific and educational spheres.

One of the most important issues discussed at the Forum was the Road Map of further development of cooperation that could provide growth of the RSA status at JINR, leading even to the act of joining of this state the JINR Member States community.

An Agreement was signed **on 21 February** on cooperation in the fields of accelerator physics and accelerator technology and education in accelerator science among JINR, the John Adams Institute of Accelerator Science, and the Royal Holloway and Bedford New College (UK).

The Agreement provides such trends of cooperation as the development of educational programmes on accelerator physics for young scientists, cooperation with European schools in high energy physics, development of opportunities to attract students to joint projects, lecture exchange for postgraduates and senior students. Joint research and elaborations for future colliders are foreseen, including the electron–positron linear collider and the ion collider NICA. The Agreement also includes issues of the educational programme elaborations on medical accelerators of protons and ions, the development of joint programmes in the accelerator studies in new proton and ion medical centres whose construction has been started in the UK and Russia, and some other trends.

The signing of the Agreement with JINR was one of the main reasons for the visit to Russia of the Director of the John Adams Institute of Accelerator Science A. Seryi. He discussed the following issues with the leaders of JINR: start of cooperation, a visit of a delegation from JINR to the John Adams Institute, organization of a meeting to establish scientific contacts, opening a so-called «Science Café» together with the British Embassy, and JINR practice courses for students from the UK.

On 28–30 March a delegation from JINR visited Belgrade (Serbia), including JINR Vice-Director Professor R. Lednický, Director of the Frank Laboratory of Neutron Physics Professor A. Belushkin, Deputy Chief Scientific Secretary D. Kamanin and staff member of the Department of International Relations E. Pryanichnikova.

On 28 March Minister of Education and Science of the Republic of Serbia Professor Ž. Obradović received the delegation. State Secretary of the Ministry Professor R. Mitrović, Ex-State Secretary Professor M. Nedelković, Assistant Minister Professor

V. Nedović, and Chief Trade Representative of the Russian Embassy in Serbia E. Kudinov participated in the meeting. It was agreed at the meeting to provide regular financing of joint scientific projects. The Minister appointed Professor R. Mitrović Plenipotentiary of the Government of Serbia to JINR.

The 2nd meeting of the Joint Coordinating Committee on cooperation between JINR and Serbia was held on 29 March at the Vinca Institute of Nuclear Sciences. On the Serbian side, it was attended by Professor M. Krmar, Doctor S. Petrović, Doctor L. Simić, and Councillor of the Ministry of Education and Science of the Republic of Serbia S. Bogdanović. The sides discussed opportunities to develop cooperation and issues of financing; Professor N. Nešković made a report «Upgrading the FAMA Facility» and Professor A. Belushkin — «Upgrading and Further Application of the IBR-2M Reactor». The JINR delegation was shown the FAMA complex and the TESLA facility.

The Committee approved financial support of five joint projects; the sides discussed opportunities to conduct mutually beneficial research at the FAMA facility and set-ups of the JINR Flerov Laboratory of Nuclear Reactions. They also marked their interest in organizing in Serbia a representative meeting on the development of cooperation where JINR leading specialists would give lectures.

A delegation from JINR consisting of JINR Chief Engineer Professor G. Shirkov, Head of the International Cooperation Department (ICD) Doctor D. Kamanin, Director of the JINR University Centre Professor S. Pakuliak and ICD Coordinator O. Matyukhina visited Oxford, the UK, **on 26–28 April**.

The visit was organized and hosted by Prof. Andrei Seryi, Director of the John Adams Institute for Accelerator Science (JAI) within the framework of the JINR–JAI Agreement signed in February this year.

The JINR delegates visited the main scientific research organizations located in Oxfordshire, where they were informed about the activities of the institutions and shown the facilities. The JINR representatives in their turn informed the UK colleagues on the activities of the Joint Institute, outlined the current and future projects at JINR and discussed the possible ways of collaboration. In particular, exchange of students and young researchers and education projects were considered. The JINR representatives invited their British colleagues from JAI and other organizations to visit JINR laboratories.

On 15–17 May, a delegation of the Gumilev Eurasian National University (Astana, Kazakhstan) visited JINR. It was headed by University Rector Professor B. Abdram. The guests were informed about the activities of JINR; they visited basic facilities of the Flerov Laboratory of Nuclear Reactions and the Laboratory of Information Technologies. The visit concluded with a

meeting at the JINR Directorate where a quadripartite agreement on cooperation in the development of grid technologies was signed.

ESFRI (EU) Chairperson, Assistant to BMBF Director General Doctor B. Vierkorn-Rudolf visited the Joint Institute for Nuclear Research **on 24 May**. A discussion of prospects of JINR cooperation with ESFRI was held at the JINR Directorate.

The guest presented a wide report about ESFRI activities since its foundation in 2002; she directed special attention to the fields whose development could arouse mutual interest. On the other hand, as a representative of BMBF, she said that in the Federal Republic of Germany there are long-term strong cooperation relations with JINR and it would be good to use the current Russian–German year of science, and its activities for further enhancement of cooperation and encouragement of new connections for wider involvement of youth. At the Flerov Laboratory of Nuclear Reactions the guest was informed about the experiments on the synthesis and chemistry of superheavy elements; she also was shown physics facilities. At the Veksler and Baldin Laboratory of High Energy Physics, Doctor B. Vierkorn-Rudolf visited the Nuclotron and got acquainted with the NICA project. Concrete steps towards integration of JINR into the European research infrastructure were discussed at the final meeting at the JINR Directorate.

The 9th meeting of the Joint Coordinating Committee on cooperation between the Republic of South Africa and the Joint Institute for Nuclear Research was held **on 1 June** in Dubna. The RSA was represented at the meeting by Chief Director of Emerging Research Areas and Infrastructure Doctor D. Adams, Director of the Department of Infrastructure Mr. C. Mokonoto, RSA–JINR Education Programme Coordinator Doctor N. Jacobs and Head of Department of iThemba LABS (Gauteng) Doctor S. Mullins. Actual issues of participation of the RSA in JINR, which were formulated during the forum «RSA–JINR: Five Years Together» held in February 2011 in Pretoria, were discussed at the meeting. JINR representatives made presentations devoted to research in the fields of neutron physics and prospects of their development, to establishment of the accelerator complex Nuclotron/NICA, and also to potentials of JINR in construction of modern cyclotrons for educational purpose in the RSA.

Further development of educational aspects of cooperation, training of young specialists from the RSA occupied a specific place in the discussion. A budget of the 5th practice for students from the RSA was approved. Participants of the Committee endorsed further broadening of the subject area of cooperation; in particular, a joint project in the field of radiobiology was started. Besides, the Committee voted that a workgroup on theoretical and nuclear physics should be organized in the RSA. Participants of the meeting unanimously

noted that endorsement and signing of decisions were operative and were conducted in an atmosphere of constructiveness and mutual understanding.

On 14 June a delegation from the National Institute of Nuclear Physics (INFN, Italy) visited JINR. It included President of the National Institute of Nuclear Physics (Italy) Professor R. Petronzio, INFN Director of International Affairs R. Pellegrini and Science Attaché of the Italian Embassy in RF, INFN Representative to JINR P. Fré, Member of the JINR Scientific Council P. Spillantini, Member of the JINR PAC for Nuclear Physics E. Vardaci.

The Italian scientists visited the Veksler and Baldin Laboratory of High Energy Physics, where they were acquainted with the project Nuclotron/NICA, the process of development of modern detectors for research in particle physics. At the Dzhelepov Laboratory of Nuclear Problems the guests visited the memorial study of Academician Bruno Pontecorvo, saw the set-up PAINUC (DUBTO) which was the start of cooperation with Italian scientists, visited the medical-technical centre. At the Flerov Laboratory of Nuclear Reactions the INFN delegation were acquainted with the work on synthesis and studies of superheavy elements.

In the House of Scientists of JINR a round-table meeting was held. The Italian scientists made reports together with JINR leaders and spoke about wide cooperation of INFN and JINR in various scientific trends and projects. The visit concluded with the signing of an agreement by JINR Acting Director M. Itkis and INFN President R. Petronzio. The agreement is for six years and continues the close cooperation in experimental, theoretical nuclear physics, astrophysics and the development of the relative technology. It has been agreed that for three years a JINR representative will be the coordinator of the joint research, and during the other three years an Italian scientist.

Ambassador Extraordinary and Plenipotentiary of Germany to RF U. Brandenburg, accompanied by a member of the Embassy Department of Science and Education I. Suleimanov, visited JINR **on 20 June**. The main objective of the visit of the Ambassador was the acquaintance with the major directions of JINR activity and a discussion of efforts on further development of cooperation. JINR Acting Director M. Itkis welcomed the Ambassador at the JINR Directorate and briefly spoke about the history of JINR and its major scientific tasks.

Mr. Ulrich Brandenburg visited the Veksler and Baldin Laboratory of High Energy Physics, where he was acquainted with the implementation of development of the new collider of heavy ions — the Nuclotron/NICA — and greeted a group of German schoolchildren from a physics study group in Berlin who came to Dubna for an educational excursion. The spectrometer complex SCAT-EPSILON was shown to the Ambassador at the Frank Laboratory of Neutron Physics. Ger-

man specialists are involved in the development of the spectrometer complex in the framework of the JINR–BMBF agreement. At the Flerov Laboratory of Nuclear Reactions the Ambassador was also acquainted with the cyclotron complex for tasks of fundamental and applied physics, in particular, the synthesis of superheavy elements, which is being held in close cooperation with colleagues from Darmstadt.

A meeting of the State Acceptance Commission was held **on 29 June** at the JINR Directorate, under the chairmanship of the Head of the Department for Priority Trends in Science and Technology of the RF Ministry of Education and Science V. Kachak. It was devoted to the energy start-up checking of the IBR-2 reactor after its upgrading. The commission included leading specialists from Rosatom, the Dollezhal Research and Development Institute of Power Engineering (NIKIET), the State Special Design Institute (GSPI), the Federal Medical-Biological Agency, and JINR. On 24 June the working commission headed by JINR Chief Engineer G. Shirkov finished the tests of the reactor, and a formal note was compiled on the readiness of the reactor for the energy start-up.

Head of the reactor upgrading programme V. Ananiev talked to the members of the commission about the main stages of upgrading, the results of the physical start-up and plans for the energy start-up of the IBR-2 reactor after the upgrading. Further tests of the reactor systems will be taken during the energy start-up, together with the studies of characteristics of its operation at various levels of power. The energy start-up that began on 5 July is planned to be completed by November. An increase of the reactor power up to the design value of 2 MW will be implemented step by step during the energy start-up.

On 5 July, Chairman of the Government of the Russian Federation V. Putin visited the Veksler and Baldin Laboratory of High Energy Physics of JINR. Director of the Laboratory V. Kekelidze spoke to the guest about the NICA/MPD project, which is planned to be applied in fundamental science and studies of the superdense state of nuclear matter. It will also allow applied research in radio medicine, alternative nuclear energy industry, aerospace studies, and electronics. The on-line operation of the JINR grid segment was demonstrated to the visitor. The RF Prime Minister was also shown components of the MPD detector and the superconducting magnets for the booster and the collider. As a token of the visit to the Laboratory, V. Kekelidze presented a winding section from the synchrotron with the engraved inscriptions «Synchrotron 1957» and «NICA Collider» to V. Putin, meaning it as a symbol of the past with prospects for the future.

Then JINR leaders V. Matveev and M. Itkis spoke to V. Putin and journalists of federal TV channels and central mass media agencies about other achievements

of JINR, in particular, the research in the superheavy elements' synthesis awarded with the State Prize, and launch of the upgraded IBR-2 reactor.

A meeting of the Government Commission on High Technology and Innovation was held at the JINR International Conference Hall. It was devoted to the discussion of the development of the scientific research infrastructure of the facilities of the «mega science» class. Heads and representatives of RF ministries, RAS, largest universities and research centres, and Governor of the Moscow Region B. Gromov took part in the meeting. The guests visited an exhibition where most advanced projects of the Institute were displayed: the Nuclotron/NICA, Grid, DViN, the proton therapy complex, InterGrafika, etc.

The 2nd meeting of the Joint Coordinating Committee (JCC) on Egypt–JINR cooperation was held **on 7 July** in the video conference format at the University Centre of JINR. The Egyptian scientists in Cairo headed by Vice-President of the Egyptian Academy of Sciences and Technology M. Sakr communicated with their colleagues.

The sides discussed first results of joint activities in the research projects approved in December 2010 in Cairo at the 1st meeting of JCC. It was stressed that despite political instability in Egypt more than a half of the tasks in the projects had been fulfilled. Staff members of the Frank Laboratory of Neutron Physics V. Shvetsov, D. Kozlenko and M. Frontasyeva made special reports at the 2nd meeting. The Egyptian colleagues expressed their wish to start practical work as soon as possible at neutron beams of the IBR-2 reactor. Special attention was paid to the results of the 3rd practice for students from Egypt (May–June 2011) and plans for the next one in 2012. The decisions of the Committee taken during the video conference were ceremoniously signed on 20 July, at the Embassy of ARE in Moscow, at the time of the celebration of the National Day of the Arab Republic of Egypt.

On 11 July, Prime Minister of the Republic of Kazakhstan K. Massimov visited the Joint Institute for Nuclear Research. He was accompanied by Ambassador Extraordinary and Plenipotentiary of RK to Russia Z. Turisbekov, Head of the Prime Minister office G. Abdrakhimov, President of the company «NAK Kazatomprom» V. Shkolnik, Vice-Minister of Industry and New Technology B. Zhaksaliev, General Director of NNC RK, and Plenipotentiary of the Government of the Republic of Kazakhstan to JINR K. Kadyrzhanov. JINR Director-Elect V. Matveev and JINR Acting Director M. Itkis received the official delegation from Kazakhstan and acquainted its members with the history and present-day activities of the Institute.

The RK Prime Minister said that the Kazakhstan leaders pay great attention to the development of the atomic energy industry and training of specialists in the

field of the atomic energy applications. In this connection the Government of the Republic of Kazakhstan is interested in deepening of cooperation with JINR in educational programmes and further development of scientific contacts of Kazakh research centres with JINR.

The guests had excursions to the Flerov Laboratory of Nuclear Reactions and the Veksler and Baldin Laboratory of High Energy Physics where they could see the advanced scientific trends and new projects that can become the basis for further development of partnership relations between Kazakh research centres and JINR.

A delegation from the Socialist Republic of Vietnam headed by the President of the corporation «Vinatom» Professor Vyong Hyu Tan arrived at JINR **on 11 August** for an official visit. The delegation included Chief of the Department of International Relations of the corporation Doctor Nguyen Mahn Hung, Chief of the Department of Radiation Safety Doctor Le Kuang Hier, and the Third Secretary of the Embassy of SRV in RF Fam Tuan Ahn. At the JINR Directorate, the guests were received by JINR Acting Director Professor M. Itkis, Head of the International Relations Department D. Kamanin, Assistant Director of the JINR Dzhelepov Laboratory of Nuclear Problems on innovation projects E. Syresin, and staff member of the protocol group of the International Relations Department O. Korotchik. Leader of the national group of SRV at JINR Nguyen Mahn Shat also took part in the meeting.

At present, JINR is cooperating with 5 Vietnamese scientific centres on 9 scientific topics. The most active scientific cooperation is conducted with the Institute of Physics of the Vietnamese Academy of Sciences and Technology (VAST). In September 2010, a delegation from JINR visited Vietnam and signed the Memorandum of Understanding between VAST and JINR, and an agreement with the Committee on Atomic Energy of SRV. The representatives of the Vietnamese side stressed the fact that much attention is paid in Vietnam to training of scientific staff and attraction of young people to science. The sides agreed to receive at JINR the first group of 20 young specialists from Vietnam, starting in the autumn of 2011.

The delegation from Vietnam visited the laboratories of the Institute; the guests saw the facility for proton therapy at DLNP and the IBA cyclotron for the proton therapy centre in Dimitrovgrad, the accelerator complex at FLNR, and were acquainted with the NICA project, the Nuclotron and the process of the construction of straw detectors at VBLHEP.

On 12 August the representatives of NTP/NECSA (the RSA) — NTP Managing Director P. van der Walt and DIPR Engineering Manager C. Ungerer — visited JINR. The guests were accompanied by the OJSC NIKIET (Moscow) Design Manager of research and isotopic reactors I. Tretyakov, Head of the Construction Department R. Kuatbekov and Deputy Engineer-

ing Manager of OJSC NIAEP (Nizhni Novgorod) V. Senoedov. The IBR-2 reactor was mainly constructed by OJSC NIKIET, which at present takes part in tendering for delivery of a specialized reactor for production of DIPR isotopes in NTP (NECSA).

The main aim of the RSA delegation visit was the acquaintance with the reactor IBR-2; after that they were welcomed at the JINR Directorate. JINR was represented by Deputy Engineering Manager G. Trubnikov, Deputy Chief Scientific Secretary D. Kamanin, IBR-2 Engineering Manager A. Dolguikh, Neutron Activation Analysis and Applied Research Sector Manager M. Frontasyeva, and Liaison Officer of the JINR–RSA Collaboration A. Belova. In the course of the discussion, both sides talked about the opening up possibilities for the development of NECSA–JINR cooperation, particularly in the organization of educational programmes and in the sphere of medical isotopes production research.

Minister of Industry and Trade of the Republic of Tatarstan R. Zaripov, Deputy Minister I. Mingaleev, Assistant Minister A. Zufarov, as well as representatives of the company «Kazankompressormash» — General Director I. Khisameev and Head of the test complex G. Ziskin, visited JINR **on 18 August**.

JINR Scientific Leader V. Kadyshevsky, JINR Vice-Director R. Lednický, VBLHEP Director V. Kekelidze, VBLHEP Chief Engineer N. Agapov, Deputy Chief Scientific Secretary of JINR D. Kamanin, and staff member of the protocol group of the International Relations Department O. Korotchik greeted the guests at the JINR Directorate.

Academician V. Kadyshevsky spoke to the guests about the history of JINR, its international cooperation, the structure of the Institute and the main trends of research. In particular, he marked the fact that JINR, as a resident of the special economic zone «Dubna», initiated 70 innovative projects among which is the project to develop detectors for discovering explosives and drugs (DViN). The Tatar representatives got especially interested in the latter project in connection with several international events planned to be held in the Republic: the World Universiade (2013), the World Swimming Championship (2015), and the Football World Cup (2018). A proposal was approved to organize a working group to investigate opportunities of cooperation in science, education, technology and innovative development.

Minister of Industry and Trade of Tatarstan R. Zaripov spoke at the meeting about the development of the Republic's economy which is implemented through innovations and investments in the framework of the cluster approach, keeping as a strategic direction the reduction of the raw materials industry branches at the expense of the development of high-technology sectors. For this purpose, programmes and initiatives were

worked out in the Republic that facilitate the development of fundamental and applied research, elaboration of new products and technologies, commercialization of innovation projects, and staff training.

The guests saw the complex Nuclotron/NICA which is under construction at the Veksler and Baldin Laboratory of High Energy Physics. It was stressed at the excursion that part of the cryogenic equipment for the project was produced at the «Kazankompressormash» enterprise. It was also mentioned that some graduates of Kazan universities work today at the Laboratory.

Director of the Laboratory of Information Technologies V. Ivanov, Deputy Director of LIT V. Korenkov and leading staff member of the Department of International Relations M. Loshchilov visited Ulaanbaatar (Mongolia) **on 22–25 August**. At the Agency on Nuclear Energy of Mongolia, the Institute of Informatics of MAS, the Mongolian State University (MSU) and the Mongolian State University of Science and Technology (MSUST), they discussed joint work to develop a Grid segment in Mongolia. Head of the national group of JINR staff members from Mongolia Doctor O. Chuluunbaatar took an active part in all negotiations.

JINR representatives met with Academician S. Ehnkhbat, Deputy Rector of MSU Ch. Ganzorig, Director of the Nuclear Research Centre of MSU Professor S. Davaa, Rector of MSUST Professor B. Damdinsurehn and discussed further efforts to attract young Mongolian specialists, including students, to research in new IT technologies. In particular, it was marked at the meeting that the training grid site, developed at the Institute of Informatics under the guidance of Professor B. Nehrguj and active support of the JINR LIT staff member N. Kutovsky, became a part of the educational and research infrastructure.

Academician S. Ehnkhbat awarded Professor V. Ivanov with the Honorary Badge of the Government of Mongolia «Advanced Scientist», for his service in the development of science in Mongolia and training of highly skilled specialists.

On 9 September, Ambassador Extraordinary and Plenipotentiary of Poland to RF W. Zajaczkowski and Councillor-Minister K. Kordasz visited JINR.

JINR Scientific Leader Academician V. Kadyshevsky and Director of the Dzhelepov Laboratory of Nuclear Problems A. Olshevskiy told the guests in detail the history of the establishment of the Institute, talked about the fundamental and applied research topics, upgrading of the existing set-ups and the development of new facilities. In particular, they discussed issues of the right of intellectual property transfer when developing such facilities, mutual agreement on standards, and training of specialists. It was marked that postgraduates, students and school pupils from Poland take an active part in schools and practice courses for young scientists at JINR.

The Ambassador of Poland was especially interested in the activities of the Medical-Technical Complex of hadron-proton therapy at DLNP, and research at the accelerator for Dimitrovgrad. Besides, the Polish guests took interest in the production of track membranes as membrane samples had been sent to the Institute of Nuclear Chemistry and Technology in Warsaw and the National Centre of Nuclear Research (established on 1 September 2011 to incorporate the Institute of Nuclear Problems and the Institute of Atomic Energy). The visit concluded with a meeting with the Polish staff members of JINR.

On 3 October, leaders of academic scientific centres of the People's Republic of China visited JINR: Vice-Director of the Chinese Academy of Sciences Academician Wenlong Zhan, and Deputy Director of the CAS Institute of Modern Physics Hongwei Zhao, and Deputy Director of the CAS Institute of Plasma Physics Yican Wu. At the JINR Directorate, JINR Vice-Directors M. Itkis and R. Lednický, JINR Chief Scientific Secretary N. Russakovich, and Head of the Department of International Relations D. Kamanin received the guests.

In his greeting address, M. Itkis marked the fact that today many scientific centres and universities of Beijing, Lanzhou and other Chinese cities cooperate with JINR. He acquainted the guests with the main trends of fundamental research at JINR, its basic facilities, the status of implementation of the NICA project, capacities of the accelerator complex of FLNR and the IBR-2M reactor. The guests were also interested in applied research conducted at JINR. They had excursions to JINR laboratories.

A delegation of leading specialists of the Veksler and Baldin Laboratory of High Energy Physics headed by Deputy Director of the Laboratory Professor A. Vodopianov paid an official visit to Pretoria and Cape Town (RSA) **on 18–27 October**.

The delegation from JINR took part in the meeting at the Ministry of Science and Technology of the RSA that coordinates RSA–JINR cooperation. Meetings were held with representatives of the state foundation on science development, the Dean of the Faculty of Natural Sciences of Pretoria University Professor A. Ströh and leaders of the Cape Peninsula University of Technology. The visit also included presentations of reports of members of the delegation which were devoted to establishment of the accelerator complex Nuclotron/NICA at iThemba LABS, where representatives of the University of Cape Town and the University of Stellenbosch were also invited.

The major aim of the visit was attraction of attention of a broad community of RSA scientists, engineers and managers to implementation of the NICA/MPD project at JINR. The results of the visit were discussed at a reg-

ular meeting of the Coordinating Committee on RSA–JINR cooperation on 21–22 November in Cape Town.

On 9–11 November a JINR delegation participated in a workshop on nanotechnologies and materials organized by the International Centre for Scientific and Technical Information (ICSTI) and the Department of Science and Technology of the RSA Government in Pretoria. JINR participants presented scientific results on the topics of the workshop held at JINR's Flerov Laboratory of Nuclear Reactions, Bogoliubov Laboratory of Theoretical Physics, Dzhelepov Laboratory of Nuclear Problems, Frank Laboratory of Neutron Physics and in the Multi-Access Centre «Nanobiophotonics». In the framework of the visit, JINR representatives held seminars at the University of Pretoria, the University of South Africa (UNISA, Pretoria), the Nelson Mandela Metropolitan University (NMMU, Port Elizabeth), and at the cyclotron laboratory iThemba LABS (Cape Town). A visit to the Council for Scientific and Industrial Research (CSIR) was held in the framework of the workshop.

Ambassador Extraordinary and Plenipotentiary of the Republic of Hungary to RF I. Iyedyarto and Science and Technology Attaché of the Hungarian Embassy Dr. Á. Erdéiy visited JINR **on 30 November**. The guests were welcomed at the JINR Directorate by Acting Director V. Matveev, Vice-Directors M. Itkis and R. Lednický, and Deputy Chief Scientific Secretary D. Kamanin.

V. Matveev informed the guests about the major directions of JINR activities, emphasizing a big contribution of Hungarian scientists to formation and development of JINR.

During the visit the delegation toured the Veksler and Baldin Laboratory of High Energy Physics, where the guests were acquainted with the Nuclotron facility and the future project NICA/MPD. The guests visited the Flerov Laboratory of Nuclear Reactions and got acquainted with experiments on synthesis and chemistry of superheavy elements, and also the guests were shown the cyclotron complex IC-100 for production of track membranes. At the Dzhelepov Laboratory of Nuclear Problems the guests were acquainted with the proton therapy complex, innovative development in matrix detectors for computer and position-emission tomographs of the next generation and the joint project with the Belgian company IBA — the cyclotron for proton therapy C235-V3.

Following the results of the meeting, a number of possible directions of cooperation were defined, including the interest of JINR to products of Hungarian high-technology companies. The guests showed their interest in JINR innovative activities and JINR educational programmes. In conclusion, the Hungarian guests highly appreciated achievements and plans of development of JINR and implied a promise of support to JINR initiatives aimed at activation of cooperation.

CONFERENCES AND MEETINGS HELD BY JINR

Ten conferences were the largest among the scientific conferences and workshops held at JINR in 2011.

The 15th Scientific Conference of JINR Young Scientists and Specialists was held at JINR from 14 to 19 February. For 15 years the Association of Young Scientists and Specialists of JINR has been holding scientific forums for students and staff members of other Russian and foreign universities and scientific centres to acquaint them with all trends of research at the Joint Institute and the latest results of studies. This year the main topic of the conference was the studies of heavy-ion physics, including nuclear reactions with ions and experiments of the search and synthesis of superheavy elements held at JINR.

The participants and guests of the conference (including the attendees of III training courses for young scientists from CIS countries) listened to the lectures on research in this field of physics, in particular, on the recent experiment on the synthesis of element 117. The lecturers were not only leading staff members of JINR but also the guests — Professor S. Smolyansky (Saratov State University after N. Chernyshevsky) and Professor O. Grigoryan (Yerevan State University). Young researchers made 120 reports at 9 theme-based sections.

A competition for the JINR Prizes for young scientists and specialists was held in the framework of the conference.

On 28 February–1 March, *the memorial seminar devoted to the 85th anniversary of the birth of Academician Aleksandr M. Baldin* (26.02.1926–29.04.2001) was held at the International Conference Hall. JINR Acting Director M. Itkis addressed the participants of the seminar with an introductory speech. He talked to the audience about brightest facts of the creative biography of the scientist, who inspired the community of the Laboratory of High Energies under his guidance to develop the first Europe's accelerator with a superconducting magnetic system — the Nuclotron. Deputy Head of the Dubna administration A. Usov informed the participants on the discussions at the city administration of a possibility to construct a monument in memory of Academician A. Baldin.

Academician-Secretary of the RAS General Physics Department V. Matveev spoke about A. Baldin, the outstanding personality, a talented scientist and a teacher who established his own school of thought in Dubna and scored a significant mark in the history of the Institute and greatly influenced its future. A. Baldin trained a whole pleiad of talented pupils, but all his life he sincerely respected and felt utter gratitude to his teachers Academicians V. Veksler, M. Markov and N. Bogoliubov who immensely influenced his scientific career. This succession, profound for science, was the core of his creative career. V. Matveev shared his memories about the occasions when he met A. Baldin and

expressed his confidence that the best monument to the scientist would be the development of the scientific trend founded by him, the relativistic nuclear physics, and the implementation of the NICA project that would place the Institute to the forefront of advanced scientific centres in this field of physics.

Professor A. Malakhov added some personal details to the portrait of the teacher — not only an outstanding scientist and science organizer, but also the head of the largest laboratory of the Institute who never forgot about the social support for staff members — the issue he used to call «the principle of the maximal favour».

Further development of the Nuclotron is conducted at the Laboratory of High Energy Physics that bears the names of Academicians V. Veksler and A. Baldin; on the basis of the Nuclotron a collider of heavy ions is constructed to study new properties of nuclear matter. VBLHEP Director Professor V. Kekelidze spoke about the prospects of research and further development of ideas of Academician A. Baldin.

The participants of the seminar visited the memorial study of Academician A. Baldin in the Laboratory.

The reports made at the seminar were devoted to the development of scientific trends founded by A. Baldin. Academician D. Shirkov shared his reminiscences about his meetings with A. Baldin, about his creative ideas, intuition, the combination of a deep philosophic approach to apprehending scientific problems and his striving to apply the scientific results in practice.

Doctor of Physics and Mathematics Anton A. Baldin devoted his presentation to methodological aspects of the development of relativistic nuclear physics. Professor V. Burov spoke about the theoretical issues of this trend of science. For many years he has been one of the devoted organizers of the Baldin International Seminar on Problems in High Energy Physics. Professor A. Vodopianov made a review report about the modern status and prospects of research at the LHC at CERN. Doctor of Physics and Mathematics P. Zarubin concluded the seminar with his report on the studies with relativistic radioactive nuclei at the Nuclotron. A photo exhibition accompanied personal memoirs of the speakers — it was organized in memory of one of the scientists who belonged to the golden pleiad of the founders of scientific schools in Dubna.

On 10–11 March, the symposium «*JINR at the Centenary of the Discovery of Nucleus*» was held at the conference hall of the Bogoliubov Laboratory of Theoretical Physics. Its participants were scientists from the Joint Institute for Nuclear Research, scientific centres of Russia and other countries, the Nuclear Physics Department of RAS, students and postgraduates from various universities.

The Symposium agenda included 13 scientific reports made by leading scientists of JINR, the Kur-

chatov Institute, IHEP (Serpukhov), Warsaw University (Poland), the Institute for Nuclear Physics (Bucharest, Romania), and the Charles University (Prague, Czechia).

The following reports were made: «How It All Happened a Hundred Years Ago» (L. Ponomarev), «Rutherford and Gamov: Nucleus and Quantum Mechanics» (S. Gershtein), «Nuclei in the Boundaries of the Nucleon Stability» (M. Pfutzner), «Spontaneous Fission of Nuclei: Superheavy Nuclei» (Yu. Oganessian), «Cluster Radioactivity: Theory and Experiment» (D. Poenaru), «Superfluidity of Nuclear Matter: From Nuclei to Stars» (V. Voronov), «Neutrino Oscillations» (S. Bilenky), «Double Beta Decay: Past and Future» (V. Brudanin), «That Amazing Neutron» (A. Frank), «Many Faces of Isomers» (S. Karamyan), «Slow Neutron Capture» (F. Bechvarzh), and «Hot and Boiling Nuclei» (V. Karnaukhov).

XIX International Seminar on Interaction of Neutrons with Nuclei (ISINN-19), which was held in Dubna on 25–28 May, gathered about a hundred scientists from Bulgaria, Czech Republic, France, Germany, Russia, Serbia, South Africa, South Korea, Ukraine, the USA, and JINR. Noticeably more young people participated this year. There were 53 oral talks presented and about 20 posters discussed.

The papers presented covered a wide range of issues of fundamental and applied nuclear physics and ecology, studied with neutrons. The first physical results obtained at the new neutron source IREN, JINR, were reported. Traditionally, the section of nuclear physics with neutrons included reports on the study of fission — both neutron-induced and spontaneous; on breaking of fundamental symmetries in neutron-induced reactions; on study of the properties of neutron as a fundamental particle, and conventional neutron spectroscopy. As typical for these seminars, the subject of using ultracold and very cold neutrons in studying questions of fundamental physics was represented. Several sessions were devoted to the topical subject of using neutrons in studying a series of issues in environmental and human ecology. The seminar featured a second announcement of the new results obtained at the JINR Nuclotron in the experiments performed in March within the «Energy and Transmutation of Radioactive Waste» project, which aims at exploring the capabilities of accelerator-driven subcritical core of natural uranium in nuclear waste recycling and energy production. Great interest was caused by the report of the Czech colleagues on the progress in creating and using of pixel detectors, elaborated with the participation of the JINR specialists.

There were quite a number of young people among the foreign participants, and it provided young Russian scientists with an opportunity to establish promising scientific contacts. As usual, all participants noted with satisfaction the democratic, informal atmosphere of the

meeting, which greatly contributed to its success. In general, both the organizers and the participants agreed that holding such meetings annually is useful for maintaining and developing active research activities in nuclear physics with neutrons.

The international workshop «*Supersymmetries and Quantum Symmetries*» (SQS-2011) was held at the Bogoliubov Laboratory of Theoretical Physics from 18 to 23 July. These biennial meetings were initiated in 1989 by Professor V. Ogievetsky (1928–1996) and are regularly organized at BLTP.

This time, the main topics of the conference were string theory, quantum and geometric aspects of supersymmetric theories, higher-spin theories, supersymmetric integrable models, quantum groups and noncommutative geometry, the Standard Model and its supersymmetric extensions.

The event was attended by 123 scientists. They represented Armenia, Australia, Austria, Belgium, Brazil, Bulgaria, the Czech Republic, France, Germany, Greece, India, Italy, Korea, Mexico, the Netherlands, Poland, Romania, Russia, Serbia, Spain, Sweden, Ukraine, the United Kingdom, and the USA. Among the participants there were leading experts in the theory of elementary particles, quantum field theory, gravitation and string theory, noncommutative geometry and integrable systems: E. A. Bergshoeff (University of Groningen), J. Buchbinder (Tomsk University), M. Vasiliev (Lebedev Physical Institute, Moscow), G. Zoupanos (National Technical University, Athens), O. Lechtenfeld (Hannover University), J. Lukierski (Wroclaw University, Poland), D. Sorokin (Padova University), K. S. Stelle (Imperial College, London), A. Tseytlin (Imperial College, London, and Lebedev Physical Institute, Moscow), P. Fre (Torino University), M. Henningson (Chalmers University of Technology, Göteborg), and others. Like in the previous years, the meeting collected many actively working young researchers from Moscow, Tomsk, Kharkov, Sofia and Yerevan, as well as from JINR. The SQS-2011 workshop became possible due to the financial support from JINR BLTP, the Russian Foundation for Basic Research, the Dynasty Foundation, the Heisenberg–Landau, Blokhintsev–Votruba and Bogoliubov–Infeld Programmes.

The results of SQS-2011 have once more highlighted the fundamental role of the theory of strings, supersymmetry and quantum symmetries in modern theoretical and mathematical physics, the importance of further studies in these directions, and the fruitfulness and effectiveness of the international scientific cooperation with the participation of JINR.

The 11th international school-seminar «*Topical Problems in Physics of Microworld*» was held on 1–12 August in the holiday centre «Zoloty Peski» (Golden Sand) of the Gomel region (Belarus). One hundred and thirty scientists from Belarus, Russia, Ukraine,

Azerbaijan, Germany, Spain and specialists and experts from CERN took part in it. The main organizers of the school-seminar were the Joint Institute for Nuclear Research and the National Centre of Particle Physics and High Energy Physics of the Belarussian State University.

The tradition of Gomel international scientific and educational forums on particle and high energy physics has had long history and is connected with the names of such outstanding scientists as N. Bogoliubov, V. Belyj, B. Bokut, V. Kadyshevsky, F. Fedorov and their colleagues and pupils in Minsk, Gomel and Dubna.

The main purpose of the school-seminar has been successfully attained for all the period of the events organization and is the following: to educate scientific youth, discuss the latest fundamental results in the rapidly advancing fields of modern physics, cutting edge technology, related new and high technology, exchange of information and experience in experimental methodology, to establish and further develop business contacts among scientists of leading international and national scientific centres.

This year, the school was devoted to the latest scientific results obtained by physicists in microworld to decipher deepest mysteries in the matter structure. In particular, scientists interpret new boundaries of the Standard Model application and search for possible gateways beyond it.

On 12–19 September, Varna hosted the traditional *23rd International Symposium on Nuclear Electronics and Computing* (NEC-2011) organized jointly by JINR, CERN and the Institute of Nuclear Research and Nuclear Energy of the Bulgarian Academy of Sciences (INRNE, BAS, Sofia). Almost 100 scientists from 15 countries attended the event: Azerbaijan, Belarus, Bulgaria, Czechia, France, Georgia, Germany, Italy, Kazakhstan, Poland, Romania, Russia, Switzerland, Ukraine and the USA. More than 30 participants were 36 years old and younger (from Azerbaijan, Belarus, Bulgaria, Czechia, Georgia, Poland, Romania, Russia and Ukraine). The participation of more than 20 young scientists was supported by special grants provided by the Directorates of CERN and JINR. For the first time specialists from Azerbaijan and Kazakhstan took part in the symposium. The symposium programme covered the following topics: detector & nuclear electronics, accelerator and experiment automation control systems, trigger systems and data acquisition systems, computer applications for measurement and control in scientific research, methods of experimental data analysis, data and storage management, information and database systems, Grid computing, cloud computing, LHC computing, computer networks for scientific research; innovative IT education: experience and trends.

Sixty-one oral reports and 28 poster presentations were submitted (25 oral reports and 13 posters made by JINR participants). It is pleasant to note that the

young attendees made 22 oral and 8 poster high-level presentations.

The scientific programme of NEC-2011 was supplemented by an interesting social programme: a cognitive excursion to the planetarium and a trip to the picturesque Kaliakria Cape.

The joint JINR–CERN–MEPI school «*Grid and Modern Information Systems*» (with the participation of the «Skolkovo» Foundation) held on 24–28 October was the platform for students from MEPI, MIPT, MSU, MEI, St. Petersburg Polytechnical University, Nizhni Novgorod University, «Dubna» University, the JINR UC, and universities of Bulgaria, Georgia, Poland and Ukraine to update their knowledge levels. Specialists on information technology from CERN, JINR and other centres were lecturers at the school. This event was held in Dubna for a second time.

At the opening ceremony, chairman of the Organizing Committee of the school N. Russakovich acquainted the audience with the main tasks of the seven-year programme of the JINR development. MEPI President B. Onykij stressed in his speech the necessity to develop cooperation of universities with JINR and CERN, to train highly skilled specialists in modern information technology.

The school overlapped two directions in information technology: the development of modern IT software for such megaprojects as the LHC and NICA, grid technology, cloud computing and other modern information technologies. In the nearest future, an agreement is to be signed on the associate membership of the Russian Federation at CERN. Another important event of the coming future is the establishment of an LHC data processing centre of the Tier1 level on the basis of JINR and RRC «Kurchatov Institute».

The participants of the school visited the Central Information Computing Complex of LIT and saw sights of Dubna.

The 14th international conference «*Science. Philosophy. Religion*» was held on 10–11 November at the International Conference Hall. It was organized by the Foundation of St. Andrew the First Called and the Centre of the National Glory (Moscow), the Joint Institute for Nuclear Research, with participation of the Moscow Orthodox Theological Academy, the Lomonosov Moscow State University and the Institute of Philosophy of RAS. The theme of the conference was «The Man in the Technological World: Challenges of the 21st Century».

Technology influences all spheres and form of human social life in the modern world. Technology has become an inseparable part of science, art, philosophy and religion. However, the modern form of technology, in contrast to the previous one, is not only a simple accompaniment of the man's life but it facilitates the re-construction of both the man and the environment around him. The theme of the world's «re-construction»

has become the central topic of discussion, as it is in this connection that the main risks lie in the choice of the development route for the modern society.

On 10–18 December an Italy–Russia round-table conference was held at JINR. It included two sections «*Astrobiology: New Ideas and Research Trends*» and «*Black Holes in Mathematics and Physics*», and was organized by the Embassy of Italy in Russia jointly with JINR and RAS Scientific Council on astrobiology. The topics of the conference covered a wide range of issues on the origin of life, evolution on the Earth and in space, and existence of life in extreme conditions. A number of reports by Russian and Italian scientists concerned studies of space dust and search for organic molecules in space. Much attention was paid to aspects of search for exoplanets, long-term manned missions in space beyond the Earth's magnetosphere, and opportunities to apply nuclear physics methods for the analysis of terrestrial and extraterrestrial objects.

About 20 Italian specialists took part in the round-table discussion. They represented the following well-known international universities and research centres: the Italian Aerospace Agency, Universities of Florence, Genoa, Milan, Rome (La Sapienza), Turin and Tuscany, the National Institute of Cancer and the Institute of Protein in Naples, and the Astronomical Observatory in Trieste.

The Russian Federation was represented by leading researchers from the Borisyak Paleontological Institute of RAS, the Sternberg Astronomical Institute, the Space Research Institute of RAS, the Institute of Medical and

Biological Problems of RAS, the Konstantinov Institute of Nuclear Physics in St. Petersburg, the Institute of Cytology of RAS, the Borekov Institute of Catalysis of SB RAS, the Alikhanov Institute of Theoretical and Experimental Physics, and the Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of RAS.

The participants noted the interdisciplinary character of the topics of the discussions and an effective frame of the event that brought together leading specialists in various fields of knowledge related to astrobiological research. The discussions touched upon the subject of possible organizing a sector of astrobiology on the basis of the JINR Laboratory of Radiation Biology. Leading specialists remarked that JINR is unique as a large international scientific centre with great experience in fundamental research. This fact allows regarding JINR as a potential site for the development of a laboratory complex that includes clean rooms for astrobiological research. There were also discussions of agreements between the RAS Scientific Council on astrobiology and MSU on the establishment of the Chair of Astrobiology that will allow training young specialists in specific trends.

The main results of the round-table conference were the establishment of new contacts between Italian and Russian scientists, and the achievement of important agreements on possible cooperation. The participants noted the high level of the event. They suggested that such meetings should be organized in future where Russian and Italian scientists would meet.

PARTICIPATION OF JINR IN INTERNATIONAL CONFERENCES

In 2011, JINR scientists and specialists participated in 253 international conferences.

The largest delegations representing JINR attended the following events: the Taiwan–Russian Symposium on Scientific Cooperation in the Field of Nuclear Research and Applications in Medicine (Taipei, Taiwan); the Daya Bay Workshop (Shenzhen, China); the Joint Helmholtz–Rosatom Winter School for Young Scientists at FAIR (Darmstadt, Germany, Hirscheegg, Austria); the 45th Winter School of the St. Petersburg Nuclear Physics Institute (PNPI) on Physics of Nucleus and Elementary Particles (St. Petersburg, Russia); the DITANET School on Beam Diagnostics (Stockholm, Sweden); the PANDA Workshop (Darmstadt, Germany); the 45th PNPI Winter School on Condensed Matter Physics (Roshchino, Russia); the EPS conference «Nuclear Physics in Astrophysics V» (NPA5) (Eilat, Israel); the 17th CBM Workshop (Dresden, Germany); the student scientific conference «Space Age: Society and Science» (Korolev, Russia); the 48th international scientific student conference «Student and Scientific and Technological Progress» (Novosibirsk,

Russia); the 48th All-Russian Conference on the Problems of Particle Physics, Plasma Physics, Condensed Matter Physics and Optoelectronics (Moscow, Russia); the 10th Conference of the RAS Institute of Medical and Biological Problems for Young Scientists, Specialists and Students (Moscow, Russia); the 5th Conference on Fusion (FUSION 11) (St. Malo, France); the Russian conference «Topical Problems of Toxicology and Radiobiology» (St. Petersburg, Russia); the 2nd international conference «Modeling of Nonlinear Processes and Systems» (Moscow, Russia); the all-Russian scientific and practical conference «Monitoring of Health, Quality and Way of Life of the Russian Population. The Effect of Behavioural Risk Factors on the Population's Health» (Moscow, Russia); the 8th international conference «Ultra-Cold and Cold Neutrons: Physics and Sources» (St. Petersburg, Russia); the 14th International Conference on Hadron Spectroscopy (Munich, Germany); the International School of Subnuclear Physics (Erice, Italy); the 14th Russian Gravitational Conference — the International Conference on Gravitation, Cosmology and Astrophysics

(RusGrav-14) (Ulyanovsk, Russia); the international conference «Advanced Many-Body and Statistical Methods in Mesoscopic Systems» (Constanța, Romania); the international conference «Advanced Carbon Nanostructures» (CAN-2011) (St. Petersburg, Russia); the meeting «Isomers in Nuclear and Interdisciplinary Research» (INIR-2011) (Peterhof, Russia); Daya Bay Workshop (Beijing, China); the 5th European Conference on Neutron Scattering (Prague, Czechia); the 36th National Conference on Theoretical Physics (Quy Nhon, Vietnam); the Summer School on Nuclear Physics (Zerenda and Astana, Kazakhstan); the 15th International Lomonosov Conference on Physics of Elementary Particles (Moscow, Russia); the 18th Euroschool on Exotic Beams (Jyväskylä, Finland); the Moscow International Symposium on Magnetism (Moscow, Russia); the International Particle Accelerator Conference (IPAC-11) (San Sebastian, Spain); the 12th International Conference on Topics in Astroparticle and Underground Physics (TAUP-2011) (Munich, Germany); the 19th International School on Nuclear Physics, Neutron Physics and Applications (Varna, Bulgaria); the International Workshop on e^+e^- Collisions from Phi to Psi (Novosibirsk, Russia); the 3rd International Workshop on Compound Nuclear Reactions and Related Topics (Prague, Czechia); the 8th international conference «Nuclear and Radiation Physics» (Almaty, Kazakhstan); the 20th International Workshop on High Energy Physics and Quantum Field Theory (QFTHEP 2011) (Sochi, Russia); the 17th GANIL Colloquium (Belgodere, France); the 8th all-Russian scientific conference of young scientists and students «State-of-the-Art and Priorities of Fundamental Sciences in Regions» (Anapa, Russia); the 3rd International Conference on Nuclear Fragmentation (NUFRA 2011)

(Kemer, Turkey); the international research and practical conference «Many-Scale Modeling of Structures and Nanotechnologies» (Tula, Russia); the 61st international conference «Problems of Nuclear Spectroscopy and Nuclear Structure» (Nucleus-2011) (Sarov, Russia); the international conference «Physics in the LHC Era» (Tbilisi, Georgia); the extended workshop «Computational Physics: Algorithms, Methods and Results» (Tarusa, Russia); the joint workshop «Particle Physics, Nuclear Physics and Astroparticle Physics: Experiment & Accelerator Technology» (Barcelona, Spain); the international workshop «Research and Development Results in Nanotechnologies and Modern Materials Science for Joint Projects of South Africa and ICSTI Member States and Their Partners» (Pretoria, South Africa); the Symposium on Exciting Physics: Quarks and Gluons, Atomic Nuclei, Biological Systems, Networks (Makutsi, South Africa); the National Conference on Application of X-ray, Synchrotron Radiation, Neutrons and Electrons for Studying Nanosystems and Materials and Nano-Bio-Cognitive Technologies (Moscow, Russia); the 8th Conference on Nuclear and Particle Physics (Hurghada, Egypt); the Scientific Session-Conference of the Nuclear Physics Section of the Physical Sciences Division of the Russian Academy of Sciences (Moscow, Russia); the Workshop on the Emission of the Prompt Gamma Rays in Fission and Related Topics (Novi Sad, Serbia); the RO-LCG workshop «Applications of Grid Technologies and High Performance Computing in Advanced Research» (Bucharest, Romania); the GDRE Workshop on Relativistic Ion Physics (Warsaw, Poland); the 39th PANDA Collaboration Workshop (Darmstadt, Germany); the international conference of young scientists «Modern Problems of Theoretical Physics» (Kiev, Ukraine).

DEVELOPMENT OF THE JINR INTERNATIONAL COLLABORATION AND RELATIONS OF THE YEAR 2011

1. Number of short-term visits to JINR by specialists from Member States (not counting Russian specialists)	976
2. Number of visits of specialists from other countries incl. visits of specialists from other countries	729 348
3. Number of visits by JINR specialists to Member States	1005
4. Number of visits to international conferences and research centres of other countries incl. visits to associated countries	1613 615
5. Quantity of conferences held by JINR	89
6. Number of JINR fellows	10
7. New cooperation agreements (memorandums of understanding), addendums to existing ones	12

LIST OF CONFERENCES AND MEETINGS HELD BY JINR IN 2011*

No.	Name	Place	Date	Number of participants
1.	Meeting of the Programme Advisory Committee for Nuclear Physics	Dubna	20–21 January	62
2.	International conference «Classical and Quantum Integrable Systems»	Protvino, Russia	24–27 January	74
3.	Meeting of the Programme Advisory Committee for Particle Physics	Dubna	25–26 January	64
4.	Meeting of the Programme Advisory Committee for Condensed Matter Physics	Dubna	27–28 January	58
5.	9th Winter School on Theoretical Physics	Dubna	30 January – 6 February	60
6.	21st meeting of the Joint Committee on IN2P3–JINR Cooperation	Dubna	31 January	10
7.	Courses (Training) for CIS Young Scientists	Dubna	31 January – 20 March	59
8.	21st meeting of the Steering Committee for the BMBF–JINR Agreement Implementation	Darmstadt, Germany	7–8 February	16
9.	Forum «RSA–JINR: Five Years Together»	Pretoria, South Africa	8–11 February	55
10.	15th Scientific Conference of JINR Young Scientists and Specialists	Dubna	14–19 February	162
11.	109th session of the JINR Scientific Council	Dubna	18–19 February	66
12.	International workshop «CMS Upgrade Strategy»	Dubna	21–22 February	65
13.	Memorial seminar devoted to the 85th anniversary of Academician A. Baldin's birth	Dubna	28 February – 1 March	200
14.	School on Modern Physics	Dubna	4–5 March	44
15.	Symposium «JINR at the Centenary of the Discovery of Nucleus»	Dubna	10–11 March	118
16.	2nd International Meeting on JINR FLNR–S3–GANIL Cooperation	Dubna	14–16 March	35
17.	Meeting of the JINR Finance Committee	Dubna	22–23 March	59
18.	Session of the Committee of Plenipotentiaries of the Governments of the JINR Member States	Dubna	25–26 March	81
19.	2nd meeting of the JINR–Serbia Joint Coordinating Committee	Belgrade, Serbia	29–30 March	16
20.	15th research workshop «Nucleation Theory and Applications»	Dubna	16–24 April	65
21.	Workshop «Advanced Nuclear Methods for Condensed Matter Studies»	Minsk, Belarus	17–22 April	40
22.	VSAT Russia 2011	Dubna	20–21 April	100
23.	Round table «Topical Issues of Radiation Safety in Long-Term Space Flights» (dedicated to the 50th anniversary of the first manned space flight)	Dubna	25–26 April	46
24.	Advanced Study Institute «Symmetries and Spin»	Pec pod Snezkou, Prague, Czechia	10–15 May	105

*A number of conferences were held jointly with other organizations.

No.	Name	Place	Date	Number of participants
25.	General Meeting of the CIS International Innovation Centre of Nanotechnologies	Dubna	12 May	32
26.	School (Practice) for Students from the Arab Republic of Egypt	Dubna	16 May – 4 June	31
27.	Joint APCTP–JINR BLTP Workshop on Theoretical Physics	Dubna	16–21 May	36
28.	5th workshop of the CBM-MPD consortium «Prototyping STS towards Practical Applications»	Alushta, Ukraine	16–20 May	33
29.	15th Annual RDMS CMS Collaboration Conference	Alushta, Ukraine	16–20 May	70
30.	Workshop «Higgs Subgroup in the ATLAS Collaboration»	Dubna	17–19 May	40
31.	15th JINR–ATLAS Workshop	Dubna	24–25 May	50
32.	2nd Youth Innovation Forum of Russian Science Cities	Dubna	24 May	69
33.	XIX International Seminar on Interaction of Neutrons with Nuclei (ISINN-19)	Dubna	25–28 May	102
34.	Meeting of the Nuclotron-M/NICA Machine Advisory Committee (MAC) (video conference)	Dubna	26–28 May	15
35.	SANS–YuMO User Meeting on the Start-up of Scientific Experiments at IBR-2M (devoted to the 75th anniversary of Yu. Ostanevich’s birth)	Dubna	27–30 May	81
36.	Meeting of the Programme Committee of the closed corporation «International Innovation Centre of Nanotechnologies»	Dubna	27 May	17
37.	Meeting of the ATLAS Collaboration on Computing	Dubna	31 May – 2 June	48
38.	9th meeting of the RSA–JINR Joint Coordinating Committee	Dubna	1 June	12
39.	Meeting of the Working Group under the CP Chairman on JINR Financial Matters	Baku, Azerbaijan	6–10 June	25
40.	Workshop of the Baikal Collaboration	Dubna	7–10 June	55
41.	Round Table on Cooperation between JINR and INFN (Italy)	Dubna	14 June	34
42.	Meeting of the Programme Advisory Committee for Nuclear Physics	Dubna	16–17 June	65
43.	Meeting of the Programme Advisory Committee for Particle Physics	Dubna	21–22 June	65
44.	Scientific School for Physics Teachers of JINR Member States	Dubna	26 June – 1 July	62
45.	Meeting of the Programme Advisory Committee for Condensed Matter Physics	Dubna	27–28 June	60
46.	International conference «Hadron Structure»	Tatranska Strba, Slovakia	27 June – 1 July	40
47.	6th international school «Nuclear Methods and Accelerators in Biology and Medicine»	Dubna	2–12 July	62

No.	Name	Place	Date	Number of participants
48.	11th Baikal School on Physics of Elementary Particles and Astrophysics (Baikal ISU–JINR Summer School)	Bolshie Koty, Russia	3–10 July	80
49.	International conference «Mathematical Modeling and Computational Physics»	Poprad, Slovakia	4–8 July	70
50.	2nd meeting of the ARE–JINR Joint Coordinating Committee (video conference)	Dubna	7 July	16
51.	4th Advanced Courses in Nanotechnologies for CIS Young Scientists	Dubna	10–18 July	77
52.	15th international conference «Symmetry Methods in Physics» in memory of Academician A. Sissakian	Dubna, Yerevan, Armenia	12–16 July 25–29 July	62 30
53.	School (Practice) for Students of JINR Member States	Dubna	13–30 July	69
54.	15th JINR Young Scientists and Specialists Summer School	Dubna	14–16 July	45
55.	International workshop «Supersymmetries and Quantum Symmetries» (SQS-2011)	Dubna	18–23 July	112
56.	Helmholtz international school «Nuclear Theory and Astrophysical Applications»	Dubna	24 July – 2 August	74
57.	3rd JINR–Romania Joint Workshop on Neutron Physics	Targoviste, Romania	24–30 July	55
58.	11th Gomel international school-seminar «Topical Problems in Physics of Microworld»	Gomel, Belarus	1–12 August	130
59.	7th international conference «Quantum Theory and Symmetries»	Prague, Czechia	7–13 August	300
60.	International workshop «Structural Aspects of Biocompatible Ferrocloids: Stabilization, Properties Control and Application»	Dubna	19–20 August	45
61.	International conference «New Trends in High Energy Physics»	Alushta, Ukraine	3–10 Sep- tember	80
62.	School (Practice) for Students from South Africa and Belarus	Dubna	4–25 Sep- tember	70
63.	School (Practice) for Students from Ukraine	Dubna	4–10 Sep- tember	16
64.	4th International Conference on the Chemistry and Physics of the Transactinide Elements (TAN 2011)	Sochi, Russia	5–11 Sep- tember	100
65.	Helmholtz international school «Lattice QCD, Hadron Structure and Hadronic Matter»	Dubna	5–17 Sep- tember	70
66.	Joint KLFTP–JINR BLTP Workshop on Nuclear Physics	Beijing, China	6–8 Sep- tember	35
67.	European School on High-Energy Physics (a CERN–JINR school)	Cheile Gradistei, Romania	7–20 Sep- tember	120
68.	23rd International Symposium on Nuclear Electronics & Computing (NEC-11) and International Student School on Information Technologies	Varna, Bulgaria	12–19 Sep- tember	127

No.	Name	Place	Date	Number of participants
69.	International Workshop on Beam Cooling and Related Topics (COOL-11)	Alushta, Ukraine	12–16 September	53
70.	110th session of the JINR Scientific Council	Dubna	15–16 September	56
71.	International Workshop on Accelerator Physics devoted to the memory of V. Sarantsev	Alushta, Ukraine	17–21 September	66
72.	14th Workshop on High Energy Spin Physics (DSPIN-2011)	Dubna	20–24 September	98
73.	International conference «Advances of QFT»	Dubna	4–7 October	97
74.	International workshop «Bogoliubov Readings»	Dubna	12–15 October	49
75.	Courses (Training) for CIS Young Scientists	Dubna	16 October – 16 November	36
76.	7th international conference «Dynamical Aspects of Nuclear Fission»	Smolenice, Slovakia	17–21 October	50
77.	3rd Dubna youth scientific school «Management of Innovations»	Dubna	19–22 October	87
78.	2nd JINR–CERN–MEPI school «Grid and Modern Information Systems»	Dubna	24–28 October	111
79.	International scientific school for young scientists and students «Modern Neutron Diffraction Studies: From Promising Novel Materials to Nanotechnologies»	Dubna	31 October – 4 November	66
80.	2nd international youth school «Instruments and Methods of Experimental Nuclear Physics. Electronics and Automatics of Experimental Facilities»	Dubna	7–9 November	93
81.	14th international conference «Science. Philosophy. Religion. The Man in the Technological World: Challenges of the 21st Century»	Dubna	10–11 November	120
82.	10th meeting of the Joint RSA–JINR Coordinating Committee	Cape Town, RSA	21–22 November	14
83.	Meeting of the JINR Finance Committee	Dubna	22–23 November	56
84.	Session of the Committee of Plenipotentiaries of the Governments of the JINR Member States	Dubna	25–26 November	75
85.	Workshop of the Baikal Collaboration	Dubna	5–8 December	55
86.	Workshop on Precision Physics and Fundamental Physical Constants	Dubna	5–9 December	50
87.	Workshop on Resonance Laser Separation of Nuclear Reaction Products	Dubna	6–7 December	21
88.	Workshop «Astrophysics and Particle Physics. Their State-of-the-Art and Perspectives in Germany and Russia»	Dubna	8–9 December	89
89.	Italy–Russia Round Table «Astrobiology: New Ideas and Research Trends», «Black Holes in Mathematics and Physics»	Dubna	10–18 December	120