

# Status and Prospects of Cooperation between JINR and German Research Centres

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Round Table “JINR’s cooperation with German research centres,  
universities, organizations and foundations in the field of science and education”

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# 1 Introduction

Dear Members of the Scientific Council and Honorary guests,  
Colleagues,  
Ladies and Gentlemen:

It is my pleasure to welcome the participants of the Round Table “JINR’s cooperation with German research centres, universities, organizations and foundations in the field of science and education” and to be the first speaker.

There is a rich historic background of the scientific and technical cooperation between the Joint Institute for Nuclear Research (JINR) and German research centres.

The German Democratic Republic (DDR) was a full member of JINR since the foundation of this international organization in 1956. Excellent research enriching world science has been carried out in collaboration with German physicists. Many elements of the JINR basic facilities and experimental instruments were designed and constructed with an active participation of the DDR industry.

After the unification of Germany in 1990, the German governmental authorities proposed that a special agreement be concluded to regulate the participation of Germany in JINR. German delegation headed by Professor R. Loosch, Doctors H. Schunck and von Klitzing visited Dubna in December 1990 for negotiations about the framework of this document. The first Agreement was prepared soon by German and JINR experts and was signed on 15 July 1991.

The BMBF – JINR Agreement was the first agreement between JINR as an international intergovernmental organization and the Government of a non-member state. This document also became a prototype for the other agreements that were later concluded with non-member states, for example, Hungary.

Cooperation with Germany is a brilliant example of JINR’s scientific links. At present, the JINR physicists are carrying out a wide range of research activities with German scientists from 71 institutions and universities located in 45 German cities.

The plans and projects for the coming years have an excellent scientific potential. It is in the interest of both JINR and the German research groups to continue their cooperation in the future.

## 2 Status and Prospects of Cooperation

The JINR – BMBF cooperation is under the permanent supervision of the JINR Directorate and the BMBF authorities. The joint scientific programme and experiments are being continuously improved to meet the current interests of the participating institutions from Germany.

Today the cooperation between JINR and German Scientific Groups is based

- on the BMBF - JINR Agreement, and
- on Bilateral Agreements concluded between JINR and German Scientific Groups.

These two forms cover all JINR - German scientific activities of mutual interest. They also are a good basis for a successful research in the fields of theoretical and experimental physics.

### 2.1 JINR - German Research Centres activities

All JINR Labs have dozens of partners in Germany.

Institution in Germany	Number of joint projects
GSI (Darmstadt)	12
FZJ (Jülich)	9
FZR (Rossendorf)	7
DESY (Hamburg)	9
DESY (Zeuthen)	6
HMI (Berlin)	4
University (Heidelberg)	8
GU (Frankfurt/Main)	8
TUM (Munich)	7
LUM (Munich)	4
JGU (Maintz)	6
University (Leipzig)	6
University (Bonn)	5
TUD (Dresden)	5
JLU (Giessen)	5
FAU (Erlangen)	5
University (Dortmund)	5
University (Rostock)	5
University (Tübingen)	5
HUB (Berlin)	5
FUB (Berlin)	4
University (Karlsruhe)	4
University (Marburg)	4

The theorists of the Bogoliubov Laboratory have an active cooperation with colleagues in Germany: 42 collaborating institutions, including 32 universities.

There are traditional scientific links between German physicists and the Flerov and Frank Laboratories, whose main partners are research centres in Darmstadt and Jülich.

Researchers from the Laboratory of Particle Physics participate in experiments at DESY in Hamburg. Collaboration in high-energy physics with German teams, especially at GSI, is also developing successfully by the Veksler-Baldin Laboratory of High Energies and by the Dzhelepov Laboratory of Nuclear Problems.

Partnership and fruitful relations connect the Laboratory of Information Technologies with German centres in Hamburg, Zeuthen, Heidelberg, Berlin, Leipzig and other institutions.

So, during the last 14 years the cooperation between JINR and German research centres has become stronger and has received new development. It holds promise for the future.

## 2.2 JINR - BMBF Cooperation

The BMBF supports the following four main lines of research:

- Theoretical Physics
- Heavy Ion Physics
- Condensed Matter Physics with Neutrons
- High Energy Physics at DESY.

To implement the goals of the joint projects in the framework of the JINR-BMBF Agreement and to address the problems arising in the course of its implementations, JINR and BMBF set up a coordination committee. Every year, normally in February, this Committee meets and reviews all joint projects. It distributes an annual fee among the various projects. The latest meetings of the Coordination Committee were held in Leipzig, Munich and Dubna. The Co-chairmen

from the German side during the last years were Prof. R. Loosch, Dr. V. Knoerich, Dr. J. Arnold, Dr. Hermann-F. Wagner of the Division of Basic Natural Science at BMBF.

The 15 annual meeting of the Coordination Committee for the Implementation of the BMBF-JINR Agreement on Cooperation and Use of JINR Facilities was held in Hamburg on 21-22 February 2005.

**The German side informed about its basic readiness to prolong the BMBF-JINR Agreement.** It is planned to sign the renewed agreement at the end of this year.

The JINR Directorate is grateful to Dr. Hermann-F. Wagner as well as to Prof. H. Schunck, Prof. H. Rollnik, Dr. D. Müller, Dr. G.D. Hartwig, S. Müller and I. Reinhard from BMBF for their huge work and support.

### 2.3 Joint Research Activities under the BMBF – JINR Agreement

Dozens of joint research projects are carried out under the JINR – BMBF Agreement.

Theoretical Physics & Computing	Condensed Matter Physics with Neutrons	Heavy Ion Physics	High Energy Physics at DESY
Heisenberg-Landau Programme	DN-12	HADES Programme	HERMES
	REMUR (SPN)	ALICE	H1
	EPSILON/SKAT	ANKE COSY	
	Spin-Echo		
	YuMO	Superheavies and Exotics	
	FSD	CBM	
Network Security and Monitoring	Detectors for the IBR-2 spectrometers	PANDA	TESLA/XFEL
	Electronics & Computing at IBR-2	R&D for SIS100/300 accelerators (FAIR, GSI)	ILC Physics and Detectors

Today the list of joint projects comprises 21 items, including the Heisenberg-Landau Programme in theoretical physics, 8 projects at the IBR-2 reactor. The common project of GSI and the JINR Flerov Laboratory of Nuclear Reactions on superheavies and exotics includes the development of ion sources, the experiments at VASSILISSA and COMBAS, and the study of light exotic nuclei with RIB facilities. 1 project is implemented at COSY in Jülich, 5 projects are in Darmstadt, and 4 projects are at DESY. Taking into account the mutual request of German and Dubna physicists to improve the computer links, the BMBF supports the development of networks and computing. This project is implemented jointly by DESY and the JINR Laboratory of Information Technologies.

Let me note that special attention is given for perspective projects at GSI and DESY. The activities on the X-ray Free Electron Laser, the TESLA Test Facility and on physics and detectors for the future linear collider are coordinated by DESY. R&D studies at the Facility for Antiproton and Ion Research (FAIR) of light exotic nuclei, for detectors CBM and PANDA as well as for accelerator systems at SIS100 and SIS300 are coordinated by GSI. These 6 perspective projects are invested by BMBF within the framework of the BMBF- JINR Agreement.

Let me remind you that Professor A. Wagner reported about the “Future Development of DESY” at the 96<sup>th</sup> session of the Scientific Council in June 2004. Professor H. Gutbrod reported about “The Facility for Antiproton and Ion Research (FAIR) at GSI” at the previous session in January 2005. These reports are available on the JINR Web-site.

Detailed discussion of the joint projects took place at the 5<sup>th</sup> Workshop on the Scientific Cooperation between German Research Centres and JINR which was held on 17-19 January 2005 in Dubna. 32 reports were presented by scientists from JINR and German research centres and universities. All these reports are also available on the Web-site dedicated to the Workshop.

Due to the time limit, I have no possibility to present all common projects. I will draw your attention to only two examples that are supplementary to the already mentioned activities.

The JINR Directorate gives permanent attention to the educational programme. The University Centre of JINR uses all possibilities for supporting its students. One of our partners is the German Academic Exchange Service (DAAD). Thus, a grant of this organization was awarded to the joint team from the Justus Liebig University in Giessen and from the JINR University Centre. Several students were supported within the framework of the Leonard Euler Stipend

Programme. Professor W. Scheid and Drs D. Sdvizhkov and S. Ivanova will present more information about the cooperation between DAAD and JINR.

New forms of the JINR activity have been intensively developing together with scientists from Germany under the Heisenberg-Landau Programme and the project named as the Dubna International Advanced School of Theoretical Physics. In the context of this activity, I would like to mention the Helmholtz International Summer School and the Workshop on Hot Points in Astrophysics and Cosmology. After my talk, Professor B. Heinze from the Helmholtz Association and Professor A. Filippov from the Bogoliubov Laboratory of Theoretical Physics will present more information about joint projects aimed at the Strategic Alliance for a Better Future. I am sure that the International Workshops and Schools on Physics in Dubna have already become an effective means for bringing young scientists together.

The JINR scientists are interested in developing the cooperation with German organizations including the Helmholtz Association, the German Research Foundation, and the German Academic Exchange Service. I hope that today's Round Table will promote further our joint cooperation.

I would like to inform you that the JINR Directorate initiated a creation of a special fund of the Helmholtz Association and the Russian Fund for Basic Research concerning the cooperation in sciences. The corresponding letter (you see it on the slide) is addressed to Dr Betram Heinze and Prof. Vladislav Homich, the head of the Russian Fund for Basic Research.

I would like to conclude this part of my report by two slides with statistical data.

## 2.4 Visiting Programme

Data on the visiting programme are presented in the following tables.

Visits of German Specialists to JINR

Laboratory	1995	1997	2000	2002	2003	2004
BLTP	23	17	22	23	26	36
FLNR	19	18	30	15	23	5
FLNP	24	18	21	19	15	20
VBLHE	12	20	18	12	14	9
DLNP	13	7	10	29	12	11
LPP	6	9	6	7	3	2
LIT	7	2	0	5	2	2
Others	12	5	0	3	0	1
Total	116	96	107	113	95	86
Conference participants			108	90	146	98

Visits of JINR Specialists to Germany

Laboratory	1995	1997	2000	2002	2003	2004
BLTP	85	91	83	110	103	109
FLNR	55	49	32	42	63	51
FLNP	41	28	59	58	43	54
VBLHE	24	40	51	68	87	82
DLNP	52	57	72	76	67	80
LPP	59	74	67	70	74	71
LIT	29	33	33	34	36	36
Others	16	22	40	57	33	30
Total	361	394	437	515	506	513

During the last ten years, the level for scientific missions has been stable. About 90 scientists from Germany visited Dubna every year during this period. The increasing number of visitors from JINR to Germany from 1995 to 2002 reflects the development of cooperation between JINR and the German research centres. During the last 3 years, about 500 scientists per year visited Germany. Approximately 90% of these visitors were participants of joint projects. Visits to

the Dubna conferences are preferable for the German scientists. Thus, 98 German scientists participated in the Dubna conferences in 2004.

## 2.5 Joint Publications

The brief review demonstrates an active cooperation in all fields of our joint programmes which resulted in considerable scientific output. Information about the scientific results can be found in many journals and proceedings of international conferences.

**Joint publications**

Field of activity Year:	1999	2000	2001	2002	2003	2004
Theoretical Physics						
Heisenberg-Landau Programme	84	100	87	91	113	80
Condensed Matter Physics with Neutrons	69	99	113	110	104	98
Heavy Ion Physics	42	34	40	41	38	48
High Energy Physics at DESY	24	25	32	36	30	63
<b>TOTAL:</b>	<b>219</b>	<b>258</b>	<b>272</b>	<b>278</b>	<b>285</b>	<b>289</b>

About 280 papers per year are published in refereed journals and proceedings of international conferences. These joint publications are the best argument for continuation of our cooperation and development of common research programmes.

Scientists participating in the JINR – Germany collaborations received state awards and become winners of prestigious international prizes. Thus, Professor H. Schopper (Germany) was awarded with the Russian Order of Friendship in 1996. Academician V. Kadyshevsky (Director of JINR) was awarded with the Federal Cross of Merit on the ribbon of the Order of Merit of the Federal Republic of Germany. On behalf of the Federal President of Germany J. Rau, the award was presented by the Ambassador of Germany to Russia E.-J. von Studnitz in Moscow on 19 April 2000.

The Prize after B. Wiik, presented for an outstanding contribution to scientific achievements at DESY, was awarded to Dr. M. Yurkov in 2000.

The L. Meitner Prize for Nuclear Science of the European Physical Society was awarded to Academician Yu. Oganessian in 2000.

The Humboldt Research Awards have been granted to Professor S. Bilenky in 2000, to Professor R. Jolos in 2004, and to Professor M. Itkis in 2005.

## 3 Conclusion

One of the traditional forms of evaluating our partnership relations has become Workshops on the Scientific Cooperation between German Research Centres and JINR.

In 1992 Professor H. Schopper recommended to organize a Workshop to evaluate the joint activities by scientists. The JINR Directorate and BMBF organized the first Workshop in 1992. It was a very efficient procedure for estimation of joint projects. The opinion of scientists and experts was very important for the extension of the JINR – BMBF Agreement. The second, third and fourth Workshops were held in 1995, 1998 and in 2001. The fifth Workshop, as I mentioned earlier, was held in Dubna on 17-19 January 2005.

The participants of the 5th Workshop have discussed the research work supported by BMBF and stated:

“The cooperation between JINR and German research centres and scientific groups based on bilateral Agreements and on the JINR–BMBF Agreement, started in 1991 and continued 4 times till now, has been successfully developed over the past years.

*The workshop participants conclude that*

**It is in the interest of both JINR and the German research groups to continue the cooperation in the future. The participants of the workshop strongly recommend the prolongation and extension of the scope of the JINR–BMBF Agreement.”**

The cooperation between physicists of JINR and Germany is mutually beneficial. In Dubna, German physicists have a good possibility of users’ access to the neutron beams of the IBR-2 reactor at the Frank Laboratory of Neutron Physics and to the heavy-ion beams at the cyclotrons of the Flerov Laboratory of Nuclear Reactions. The research under way at the

facilities of the Frank and Flerov Laboratories is complementary to the programmes at some German scientific centres. A new feature of our cooperation during the last few years is a mutual understanding of the need for coordination in the scientific policy definition. The plans for realizing the new projects at GSI and DESY have an excellent scientific potential. The coordination of our scientific programmes is an evident example of the collaboration going on in a well-organized way.

The JINR Directorate highly appreciates the cooperation between JINR and German scientific centres, looks forward to its successful continuation and welcomes possible extensions of the scope of the Agreement between BMBF and JINR.