



Bogoliubov Laboratory of Theoretical Physics



Dubna International Advanced School of Theoretical Physics

Rector: A.T. Filippov

Leaders: A.S. Sorin, V.V. Voronov

Main organizers and advisors:

D. Blaschke, A.P. Isaev, M.A.Ivanov, D.I.Kazakov, V.A.Osipov,
I.G.Pirozhenko, O.V.Teryaev, A.A.Starobinsky, V.I.Zhuravlev

A.B.Arbuzov, E.A.Davydov, E.A.Kolganova,
V.V.Nesterenko, P.V.Tretyakov, A.A.Vladimirov...

Research Workshops (project, 1997)

The project will consist of specialized **Research Workshops** that last for 1 to 2 months and gather a small number (3 - 5) of qualified specialists in the fields interested in contacts and short-term collaborations, as well as a group of (5 - 10) young and beginner scientists who wish to rise their qualification.

A Research Workshop comprises, first, the **workshop** itself during which experts and young scientists contact each other, including **short cycles of lectures**. Second, it includes a **small conference** (2--3 days) summarizing the workshop results.

The BLTP can be considered at present time as a leading center in different fields of theoretical physics with **well-established tradition and infrastructure for international cooperation**. It is supposed that the prerequisites related to **the infrastructure** (computer facilities, library, offices, Xerox) **will be provided by the BLTP**.

The project is headed by the Advisory Board of leading Laboratory experts; every Research Workshop will be organized by workshop coordinators.

RS WS in Dubna, **1995**: Constr. Dyn.&QG; SUSY&Q.Symm. (mem **V.Ogievetsky**); **1996**: Heavy Quark Ph.; **1997**: 6 Res. WS! **1998-1999**: 3 Res. WS; 2000-01: 6 Res.WS, **3 survive until now as DIAS schools (HQPh., Calc., CDQG=MMPH.=QG&Superstr.)**

Research Workshop

CALCULATIONS FOR MODERN AND FUTURE COLLIDERS

Dubna, Russia, July 9-23, 2000

ORGANIZERS: D.V.Shirkov - Co-chairman D.I.Kazakov - Co-chairman
Bogoliubov Laboratory of Theoretical Physics, JINR (Dubna)

SUPPORT: BMBF (Germany), RFBR (Russia), JINR and Heisenberg--Landau Programme

	Name	Title
1	D. Bardin	Standard Model and its application for precision experiments at Z- resonance
2	G. Passarino	Perturbation Theory with Unstable Particles, Fermion-Loop approach and applications
3	I. Ginzburg	Simple Approximate Methods of Calculations of Complex Processes
4	F. Tkachev	Unstable Particles in QFT
5	O. Tarasov	New methods for evaluating Feynman diagram.
6	J. Koerner	Radiative corrections to polarization observables in t-quark production and decay
7	A. Grozin	Loop Calculations in HQE
8	E. Kuraev	Introduction to BFKL (pomeron)

In 2003 this Res.WS became WS&School; from 2006 *Helmholtz DIAS School*

International Workshop and School **Quantum Gravity and Superstrings**

Dubna, Russia, June 18 - June 28, 2001

Supported by BMBF (Germany), INTAS, RFBR (Russia), UNESCO,
Heisenberg-Landau Program, Bogoliubov-Infeld Program

Advisory Committee

V. deAlfaro (Torino University, Torino)
L. Alvarez-Gaume (CERN, Geneva)
V. Kadshevsky (JINR, Dubna)
V. Kazakov (ENS, Paris)
O. Lechtenfeld (Hannover University, Hannover)
D. Luest (Humboldt University, Berlin)
D. Maison (Max Planck Physics Institute, Munich)
A. Morozov (ITEPh, Moscow)
H. Nicolai (AEI, Potsdam, Germany)
V. Rubakov (INR, Moscow)
J. Wess (Max Planck Physics Institute, Munich) --
coordinator of the School

- Noncommutative geometry and field theory
- M-theory and strings
- Extra dimensions and branes
- Integrable models in quantum gravity and gauge theories

The main goals of DIAS

- **Training courses for students, graduates, and young** scientists in the [JINR](#) Member States and other countries (according to agreements and grants);
- Looking for and supporting gifted young theorists in the [JINR](#) Member States;
- Organization of schools of different scales in Dubna and coordination with similar schools in Russia, Germany, and other European countries;
- Support of the JINR experimental programs by organizing lecture courses and review lectures on new trends in modern physics;
- Cooperation with the University Center and Dubna University in training students and postgraduates as well as in organizing schools for students;
- Coordination of the research - training programs with workshops and conferences at JINR;
- Publication of lectures and discussions in different forms, in particular, with the use of modern electronic equipment, etc.
- Supporting the WEB page of DIAS-TH which should become the organizing center of the programs related to DIAS-TH.

The main topics of the activity of DIAS should be centered around the most important directions of research at BLTP: [Theory of Fundamental Interactions](#); [Nuclear Theory](#); [Theory of Condensed Matter](#); [Modern Mathematical Physics](#).

In recent years, more and more important becomes research in **astrophysics** and **cosmology**: **DE**, **DM**, **inflation**, **baryon asymmetry**, **origin of the Universe** is the real challenge for physics – from Planck scale to the U. size.



Dubna International Advanced School of Theoretical Physics



July 2003 The first DIAS Summer School

January 27 - February 9, 2003

Winter School on Theoretical Physics

July 11 – 22, 2003

International Advanced Summer School
on Modern Mathematical Physics

International Advisory Committee

V. de Alfaro (Torino University, Torino)
L. Alvarez-Gaume (CERN, Geneva)
P. Fre (Torino University, Torino)
V. Kadyshevsky (JINR, Dubna)
V. Kazakov (ENS, Paris)
O. Lechtenfeld (Hannover University)
D. Luest (Humboldt University, Berlin)
D. Maison (Max Planck Ph.Inst., Munich)
A. Morozov (ITEP, Moscow)
H. Nicolai (AEI, Potsdam, Germany)
V. Rubakov (INR, Moscow)
J. Wess (Max Planck Phys. Inst., Munich)

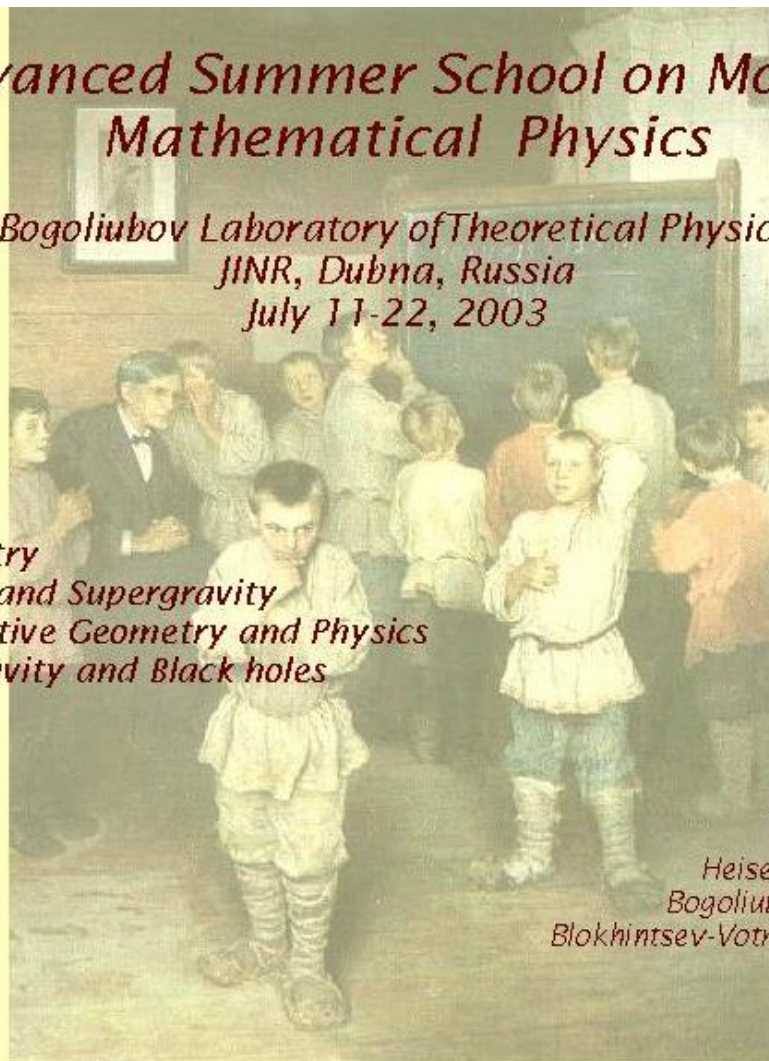
Advanced Summer School on Modern Mathematical Physics

*Bogoliubov Laboratory of Theoretical Physics,
JINR, Dubna, Russia
July 11-22, 2003*

Topics:
Supersymmetry
Superstrings and Supergravity
Noncommutative Geometry and Physics
Quantum Gravity and Black holes
Cosmology

[next]

Supported by:
JINR, BMBF,
Heisenberg-Landau,
Bogoliubov-Infeld, and
Blokhintsev-Votruba Programs



July - 2003 MPh, Incomplete list of lectures

Dmitri Sorokin (Padova) Intro. into a Classical
Theory of Higher Spin Fields
Mikhail Vasiliev (LPI, Moscow)
Higher Spin Gauge Theories
Andrei Slavnov (MI RAS, Moscow)
UV-IR mixing in noncommutative field theories
Olaf Lechtenfeld (Uni. Hannover)
Noncommutative field equations
Ignatios Antoniadis (CERN)
Physics of low-scale string models
Daniel Sternheimer (Uni. Bourgogne)
Deformation theory
A.G.Sergeev (MI RAS, Moscow)
Vortices and Seiberg-Witten equations
Ivan Todorov (INRNE, Bulgaria)
Elliptic functions and modular forms RCFT
Pietro Fre (Torino U) Duality, BH, Cosm. etc
Dieter Luest (Humboldt U, Berlin) Branes...
Loriano Bonora (SISSA,Trieste) Open strings FT
Valery Rubakov (INR,Moscow) Noncomutative
solitons: field theory counterparts of D-branes
Alexei Starobinsky (Landau Inst.) DE,DM, cosm.
Vladimir Kazakov (ENS, Paris) String theories
Alexei Zamolodchikov CFT and Liouville grav.

The first Helmholtz International Summer School

June 2005

DIAS-TH: DUBNA INTERNATIONAL ADVANCED SCHOOL OF THEORETICAL PHYSICS

Helmholtz International Summer School

Dubna, June 6 - 16, 2005

"HEAVY QUARK PHYSICS"

TOPICS:

- CKM matrix, CP violation and Beyond the Standard Model
- Dyson-Schwinger Equations, Quark Models and Sum Rules
- Charmonium Production and Dissociation processes
- Production and Decays of Heavy Hadrons
- Lattice QCD and Effective Field Theories
- Soft Collinear Effective Theory

LECTURERS INCLUDE:

M. Beneke (Aachen), A. Borisov (Moscow), S. Gerasimov (JINR), A. Grozin (Novosibirsk), R. Faustov (Moscow), R. Fleischer (CERN), J. Heitger (Muenster), V. Likhoded (IHEP), E. Lunghi (Zurich), V. Lyubovitskij (Tuebingen), J. Körner (Mainz), M. Neubert (Cornell), A. Parkhomenko (Yaroslavl), C.D. Roberts (ANL), V. Saleev (Samara), H. Satz (Bielefeld), Fl. Stancu (Liege), B. Stech (Heidelberg)

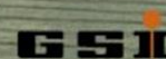
ORGANIZERS:

A. Ali (DESY), M. Ivanov (JINR)

LOCAL ORGANIZING COMMITTEE:

D. Blaschke (GSF & JINR), S. Nedelko (JINR),
V. Novikova (JINR), I. Schmeizer (Rostock & JINR), V. Zhuraviev (JINR)

For information contact: S. Nedelko Phone: +7-09621-63508 Fax: +7-09621-65064 E-mail: hq2005@theor.jinr.ru URL: <http://theor.jinr.ru/~hq2005/>



In **2014-2018**, the following activities in the framework of **DIAS-TH** were:

- **Winter Schools** on theoretical physics :
 Few-Body Systems: Theory and Applications, February 2 – 8, 2014
 Heavy-Ion Physics: from LHC to NICA, January 30 – February 4, 2017
 Partition Functions and Automorphic Forms, January 29 – February 2, 2018
- **Research Workshops:** Nucleation Theory and Applications (2014-2016);
- **Helmholtz International Summer School** “Nuclear Theory and Astrophysical Applications”, July 21 – August 1, 2014, July 10 – 22, 2017
- **International School** “Advanced Methods of Modern Theoretical Physics: Integrable and Stochastic Systems” (2014 – 2018);
- **Helmholtz International Summer School** “Lattice QCD, Hadron Structure and Hadronic Matter”, August 25 – Sept. 6, 2014, August 20 – Sept. 2, 2017;
- **Helmholtz International Summer School** “Dense Matter” June 29 – July 11, 2015;
- **Helmholtz International Summer School** “Theory Challenges for LHC Physics” and **Workshop** “Calculations for Modern and Future Colliders” July 20 -30, 2015;

NB: ‘Dense matter’ and ‘Calc.’ – ‘Helmholtz-DIAS schools’ from 2006;
 ‘Nucl. Th, & Astroph’, ‘MMPh.’ (later ‘Cosm., Strings, New Phys’, - from 2007

Helmholtz International Summer School

“Dense Matter” June 29 – July 11, 2015;

D. Blaschke (JINR Dubna & Univ. Wroclaw)

M. Bleicher (FIAS & Univ. Frankfurt)

B. Yu. Sharkov (FAIR Darmstadt & FRRC Moscow)

A.S. Sorin (JINR Dubna)

Helmholtz International Summer School “Theory Challenges for LHC Physics” and Workshop “Calculations for Modern and Future Colliders” July 20 -30, 2015;

The international school "Theory challenges for LHC physics" will be held in Bogoliubov Laboratory of Theor. Physics (JINR, Dubna) within the framework of Helmholtz International Summer School (HISS) and Dubna International Advanced School of Theoretical Physics (DIAS TH).

Introduction to hadron collider physics. Higgs physics. QCD for colliders.

Beyond the Standard Model. Computational techniques for the LHC.

Modern computational methods for scattering amplitudes. Flavor physics.

Program Committee

D.Bardin (JINR) E.Boos (SNPI MSU) T.Hahn (Munich) D.Kazakov (JINR) (Chairman)

K.Melnikov (KIT) S.Moch (DESY, Zeuthen) J.Reuter (DESY)

- **Helmholtz International Summer School** “Quantum Field Theory at the Limits: from Strong Fields to Heavy Quarks”, July 18 – 30, 2016;
- **Helmholtz International Summer School** “Cosmology, Strings and New Physics”, August 28 – September 10, 2016.
- **Helmholtz International Summer School** “Modern Colliders – Theory and Experiment 2018” and Workshop “Calculations for Modern and Future Colliders” July 22 – August 1, 2018;
- **Helmholtz International Summer School** “Matter under Extreme Conditions in Heavy-Ion Collisions and Astrophysics “, August 20 – 31, 2018;

The Schools and Workshops were attended by students, post-graduates and young scientists from JINR Member States and other countries and were supported by the RFBR, JINR, NRE HSE, Helmholtz Association, DFG, and DAAD.

Full information on the **Schools and Workshops** is available on site: <http://theor.jinr.ru/~diastp/diasth/>

- **Seminars and lectures** for post-graduates and students are organized on a regular basis.

Participation in the educational process of the Chairs of theoretical and nuclear physics, nanotechnologies and new materials at the **International University “Dubna”**.

- **Courses of lectures** were given by: G. Zoupanas (NTU Greece), G. Bossard (Ecole Polytechnique France), K. Stelle (Imperial College UK), M. Ilgenfritz (BLTP), S.V. Molodtcov (BLTP), C. Fronsdal (Univ. of California USA), S.N. Nedelko (BLTP), I. Shapiro (Univ. Federal de Juiz de Fora, MG, Brazil), E. Musaev (HSE Moscow), D.P. Sorokin (INFN, Padova, Italy), I.L. Bukhbinder (Tomsk University), O.Chalykh (Univ. of Lids UK), E. Gourgoulhon (Univ Paris 7), A. Silantyev (BLTP).

The **database** is filled up with the lectures from the schools held.

Supported by



Helmholtz International Summer Schools (HISS) Dubna

“Structure of Matter under Extreme Conditions”

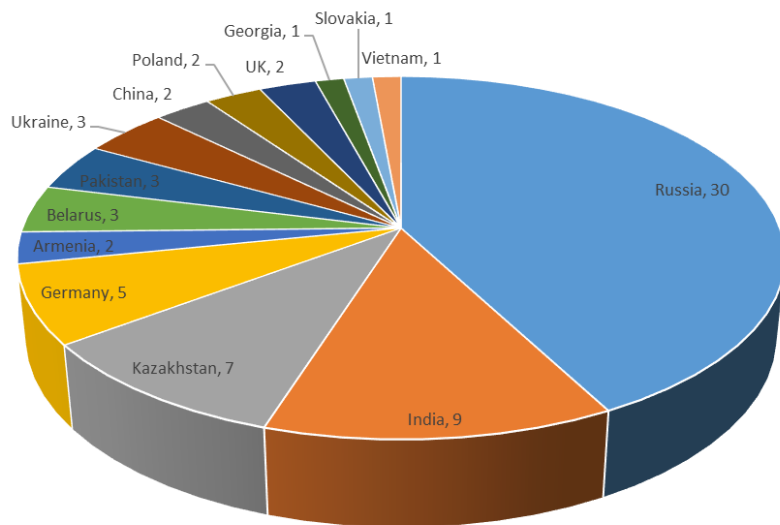
Financial Report 2014 – 2017

Year, Name of School	Helmholtz Centres and Institutes						JINR Dubna
	DESY	FZJ	HZDR	KIT	HIM	HIJ	
2014, NTAA	5.182	10.0	5.0	--	--	5.0	6.6
2014, Lattice QCD	5.694	10.0	5.0	--	5.0	--	12.5
2015, Extreme Matter	5.873	10.0			5.0	5.0	14.7
2015, Modern Colliders	4.356		5.0	10.0			9.0
2016, QFT Limits	3.314	10.0			5.0	5.0	16.4
2016, Cosmology	3.57		5.0	10.0			3.1
2017, NTAA		10.0	5.0			5.0	2.6
2017, Hadrons&Lattice		10.0	5.0		5.0		10.1
Total (keuro)	26.602	60.0	30.0	20.0	20.0	20.0	75.0

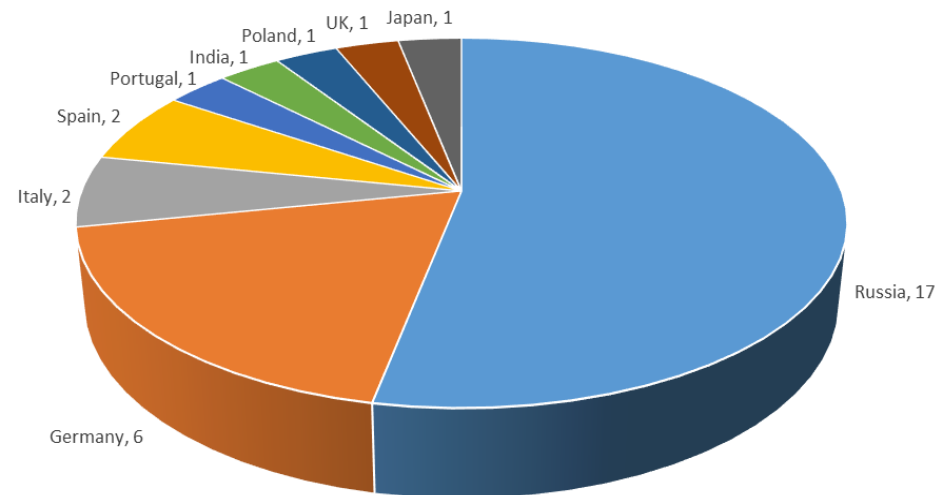
HELMHOLTZ INTERNATIONAL SUMMER SCHOOL

Dubna International Advanced School of Theoretical Physics / DIAS-TH

Statistics for Quantum Field Theory at the Limits 2016



Participants - 71



Lecturers - 32

Bogoliubov Laboratory of Theoretical Physics,
Joint Institute for Nuclear Research, July 18-30, 2016

Nuclear Theory and Astrophysical Applications

DIAS-TH: Dubna International Advanced School of Theoretical Physics
Helmholtz International Summer School

NUCLEAR THEORY AND ASTROPHYSICAL APPLICATIONS

ELTP JINR, Dubna, Russia, July 10 - 22, 2017

ORGANIZERS:

S. Heinz (GSI, Darmstadt) & J.U. Grosser
V. Voronov (JINR, Dubna)



ORGANIZING COMMITTEE:

So. secretary: N. Ananyev (JINR, Dubna)
Secretary: T. Donikova (JINR, Dubna)
A. Andriev (JINR, Dubna)
N. Andrievskiy (JINR, Dubna)
D. Belyaev (JINR, Dubna)
& U. Khocher (JINR, Dubna)
A. Filchenko (JINR, Dubna)
R. Jolos (JINR, Dubna)
T. Shmelev (JINR, Dubna)
A. Voinov (JINR, Dubna)

TOPICS:

- nuclear structure and reactions
- neutrinoless double β -decay
- superfluidity in nuclei and neutron stars
- terrestrial experiments for astrophysics
- neutrino interactions with nuclei
- nuclear matter and supernovae
- condensation and phase transitions in dense matter

Contact address:

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Organizers:

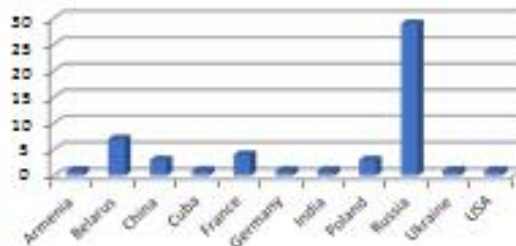
Sophia Heinz (Darmstadt)

Victor Voronov (Dubna)

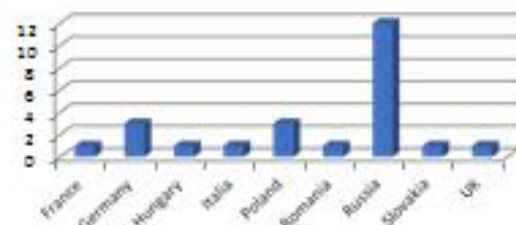
Dates: 10.07.-22.07.2017

No. of Participants (Lecturers): 52 (24)

Armenia	1
Belarus	1
China	1
Cuba	1
France	1
Germany	1
India	1
Poland	1
Russia	1
Ukraine	1
USA	1



France	1
Germany	1
Hungary	1
Italy	1
Poland	1
Romania	1
Russia	1
Slovakia	1
UK	1



DUBNA INTERNATIONAL ADVANCED SCHOOL OF THEORETICAL PHYSICS

Helmholtz International Summer School

Cosmology Strings



JOINT INSTITUTE FOR NUCLEAR RESEARCH

Bogoliubov Laboratory of
Theoretical Physics

New Physics

August 28-September 10, 2016
Dubna, Russia

Topics

Advances in supersymmetric gauge theories
Higher spin theories
Gravity, (super)symmetry, integrability
Status of new physics at LHC
Cosmology and high energy physics
Inflationary cosmology and alternatives
Dark energy and modified gravity

Organizers

A.Filippov (JINR), F.R.Klinkhamer (KIT Karlsruhe)
V.A. Rubakov (INR Moscow), V.Schomerus (Desy Hamburg)
A.A.Starobinsky (Landau Inst & JINR)



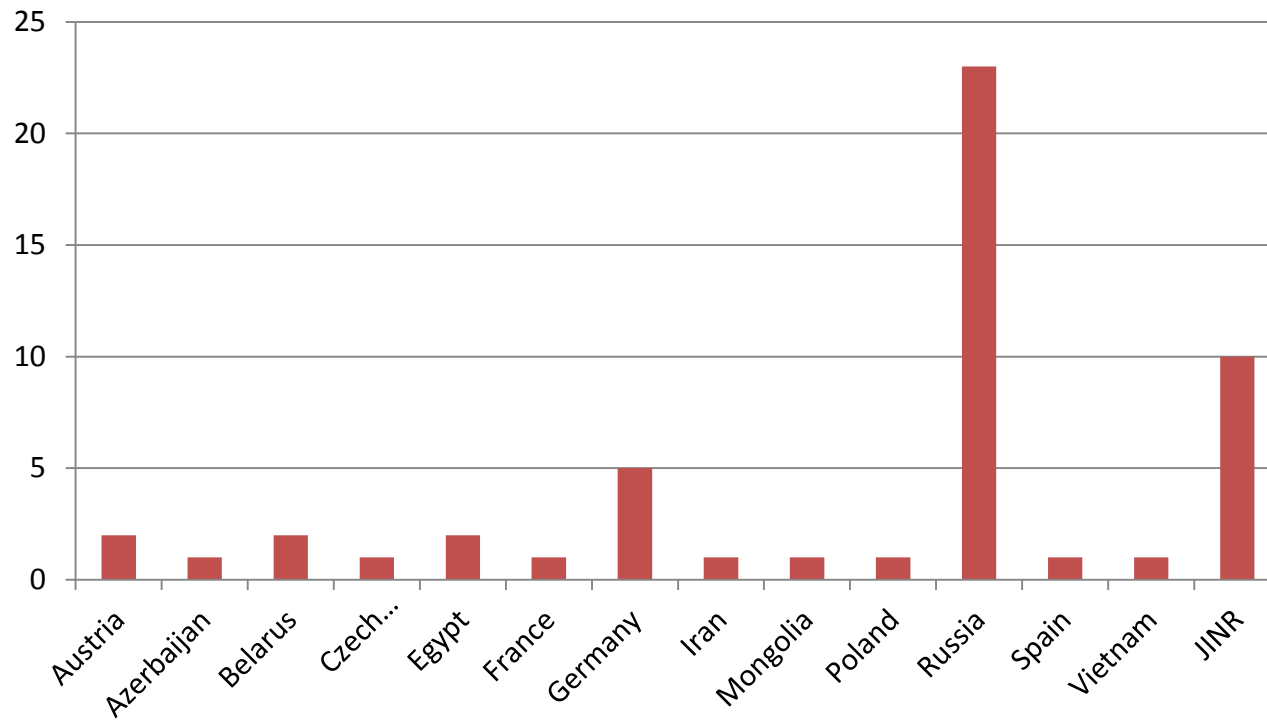
Contact

Dr. Irina Pirozhenko
BLTP JINR, Dubna, Russia
E-mail: diastp@theor.jinr.ru
<http://theor.jinr.ru/~diastp/summer16>



Students (52)

Lecturers (18)



Austria 1

Germany 3

Russia 8

JINR 6

STATISTICS FOR JINR Member States (2014 – 2017)

Armenia – 11

Azerbaijan – 3

Belarus – 24

Bulgaria – 2

Cuba – 1

Czech – 1 + 20

Georgia – 1

Kazakhstan – 11

Mongolia – 1

Poland – 10

Slovakia – 1 + 15

Ukraine – 14

Uzbekistan – 1

Vietnam – 3

Germany – 52

Joint Institute for Nuclear Research

Bogoliubov Laboratory of Theoretical Physics



Dubna International Advanced
School of Theoretical Physics



2018

January 29 – February 2

*XIV Winter School on Theoretical Physics
Partition Functions and Automorphic Forms*



July 22 – August 1

*Helmholtz International Summer School-Workshop
Calculations for Modern and Future Colliders*



August 5 – 10

*International School
Advanced Methods of Modern Theoretical
Physics: Integrable and Stochastic Systems*

August 20 – 31

*Helmholtz International Summer School
Matter under Extreme Conditions
in Heavy-Ion Collisions and Astrophysics*



Preliminary plan for 2019

- Winter School on Theoretical Physics
Condensed Matter
- Helmholtz International Summer School
QFT at the Limits: from Strong Fields to Heavy Quarks
- Helmholtz International Summer School
Cosmology, Strings and New Physics
- International School
Advanced Methods of Modern Theoretical Physics:
Integrable and Stochastic Systems

THANKS!