

**4<sup>th</sup> South Africa - JINR Symposium**  
***Few to Many Body-Systems: Models, Methods and***  
***Applications***  
***JINR Dubna, September 21-25, 2015***

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Monday, September 21, 2015  
International Conference Hall in Dubna

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10:00 Opening the Week of South Africa at the JINR

*I. Words of Welcome:*

JINR Director V.A. Matveev 10-15'  
*JINR: important events in International activity*

Deputy Director general of the Department of Science and Technology  
Th. Auf der Heide 10-15'  
*Bird's eye view of the South African National System of Innovation*

Deputy Minister of Education and Science of the Russian Federation  
L.M. Ogorodova 10-15'  
*To Be Announced*

Acting CEO of SKA Rob Adam

Minister-counselor of the Embassy of South Africa in Moscow

*II. Reports:*

D. Adams 30'  
*An Overview of the SA-JINR Collaboration: Impact on Human Capital and  
Research Capacity Development*

G. Trubnikov 30'  
*International large research infrastructure of JINR. NICA megaproject:  
challenges and perspectives*

12:00-12:20 Coffee break

12.20 Excursion to NICA facility

13:30-14:30 Lunch time

14:00-15:00 Registration for the Symposium

15:00 Opening the 4<sup>th</sup> South Africa - JINR Symposium *Few to Many Body-Systems:  
Models, Methods and Applications* (co-chairmen):  
Director of the BLTP V.V. Voronov  
Director of the SKA Rob Adam

JINR Seminar

chairman: J. Cleymans

15:10 R. Adam (SKA South Africa) 55'+5'  
Doing transformational science with the Square Kilometre Array (SKA)

16:10-16:40 Coffee break

Session: Prospects of JINR and South African basic facilities

chairman: J. Cleymans

16:40 V. Aynutdinov (INR RAS) 25'+5'  
Baikal GVD experiment

17:10 S. Wynngaardt (Stellenbosch U.) 25'+5'  
Towards the South African Underground Laboratory (SAUL)

17:40 M. Shirchenko (DLNP JINR) 25'+5'  
Neutrino experiments at the Kalinin Nuclear Power Plant

19:00 Welcome party at the restaurant, hotel "Dubna"

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Tuesday, September 22, 2015

Conference Hall

of the Flerov Laboratory of Nuclear Reactions (FLNR)

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Session(s): Nuclear Reactions (Fission and Clustering)

Conveners: D. Kamanin, S. Mullins

chairman: A. Karpov

9:00 D. Kamanin (JINR) 18'+2'  
Status and prospects of CCT study

9:20 N. Mkaza (Stellenbosch U.) 18'+2'  
Programme for LISSA setup in the University of Stellenbosch

9:40 O. Falomkina (Moscow State University/JINR) 18'+2'  
Modern mathematical methods in processing of low-statistics data

10:00 A. Yeremin (FLNR) 18'+2'  
Spectroscopy of SHE at Dubna: Results and plans

10:20 A. Nasirov (BLTP JINR) 18'+2'  
Theoretical study of a possible mechanism of the true ternary fission

10:40-11:00 Coffee break

chairman: A. Popeko

11:00 A. Karpov (FLNR JINR) 18'+2'  
Ternary clusterization of heaviest nuclear systems

11:20 F. Karpeshin (Mendeleev Inst., S-Peterburg) 18'+2'  
Many-phonon states and true ternary fission

11:40 Yu. Panebratsev (VBLHEP) 18'+2'  
Virtual laboratory of fission

12:00 V. Sargsyan (BLTP, JINR) 18'+2'  
Fusion reactions at near and sub-barrier energies

12:20 S. Zemlyanoy  
Gas-cell based setup for production and study of heavy neutron rich Nuclei

12:40 L. Grigorenko (FLNR JINR) 18'+ 2'  
Theoretical studies of few-body dynamics in the dripline nuclei and recent experimental results

13:00-14:30 Lunch time

Session(s): Few Body Systems

Conveners: A. Motovilov, S. Rakityanski

chairman: S. Rakityansky

14:30 E. Kolganova (BLTP, JINR) 25'+5'  
Ultracold atomic clusters and Efimov effect

15:00 L. Lekala (Univ. of South Africa) 25'+5'

Cluster approach for determining spectroscopy for light hypernuclei  
15:30 V.S. Melezhik (BLTP JINR) 25'+5'  
Ultracold resonant processes in atomic traps

16:00-16:30 Coffee break

Chairman: L. Lekala

16:30 S. Rakityansky (Univ. of Pretoria) 25'+5'  
Nuclear fusion  $d+Li^6 \rightarrow Be^{8*}$  induced by X-rays in Lithium-Deuteride crystal  
17:00 A. Malykh (BLTP JINR) 25'+5'  
Universal description for few two-species particles  
17:30 B. Mukeru (Univ. of South Africa) 25'+5'  
Coulomb and nuclear breakups in the  $^{11}Be$  and  $^{208}Pb$   
18:00 S. Vinitzky (JINR) 25'+5'  
Tunneling of composite particles through repulsive barriers

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Tuesday, September 22, 2015

Conference Hall

of the Frank Laboratory of Neutron Physics (FLNP)  
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Session(s): Applied Nuclear Physics  
Conveners: M.Frontasyeva, R. Newman

I. Materials science: radiation stability, materials modifications

Chairman: M.Frontasyeva

9:00 L. Petrik (Western Cape University) 18'+ 2'  
Applied Research - new trends in collaboration of SA with JINR  
9:20 V. Skuratov (FLNR JINR) 18'+2'  
High resolution electron microscopy studies of nuclear ceramics and oxides irradiated with heavy ions of fission fragment energy  
9:40 A. Janse van Vuuren (Nelson Mandela Metropolitan U.) 18'+2'  
Swift heavy ion irradiation effects on He agglomeration in solids  
10:00 A. Nechaev 18'+2'  
Sensors for toxic contaminants analyses based on the track membranes with surface enhanced Raman spectroscopy properties as a new activity in frame of RSA-JINR collaboration  
10:20 A. Rossouw, (Stellenbosch U.) 18'+2'  
Photocatalytic track-etched membranes (A review on MSc studies)

10:40-11:00 Coffee break

II. Environmental studies

Chairman: L. Petrik

11:00 M. Frontasyeva (FLNP JINR) 18'+ 2'  
An overview of collaboration with SA for the period of 2010-2015  
11:20 D. Pavlov (Inst. of Biology of Inland Waters) 18'+ 2'  
Monitoring of trace elements in marine ecosystems:  
"Mussel Watch" approach  
11:40 J. Bezuidenhout (Stellenbosch U.) 18'+ 2'  
Results of various element content analyses of invasive black mussels (*Choromytilus meridionalis*) in the coastal waters around the industrial port of Saldanha, South Africa  
12:00 R. Newman (Stellenbosch U.) 18'+ 2'  
Air pollution studies in the Western Cape area. An overview  
12:20 Z. Ndlovu (iThemba) 18'+ 2'  
Elemental analysis of mosses and lichens from Western Cape (South Africa) using NAA and ICP-MS  
12:40 P. Eze (Western Cape U.) 18'+ 2'  
Elemental composition of coal flyash: Matla coal power station in the

Mpumalanga province in South Africa case study using nuclear and related analytical techniques

13:00-14:30 Lunch time

Session: Student Session  
Conveners: S. Pakuliak, N. Mkaza

Chairman: N. Mkaza

- 14:30 O. Adeniyi (Western Cape Univ.) 13'+ 2'  
Swift heavy ion irradiation of polyester and polyolefin polymeric film for gas separation application
- 14:45 I. Zinicovscaia (FLNP JINR) 13'+ 2'  
Biotechnology of gold and silver nanoparticle production: results of collaborative study with South Africa (necsa).
- 15:00 Z. Goryainova (FLNP JINR) 13'+ 2'  
New results on NAA of mussels from South Africa
- 15:15 T. Lamula (iThemba) 13'+ 2'  
Neutron activation analysis of thin Bi targets with 90 and 140 MeV neutrons.
- 15:30 K. Kornieieva (FLNR JINR) 13'+ 2'  
Structural and micromechanical examination of ODS alloys irradiated with 1-3 MeV/nucleon heavy ions
- 15:45 R. Rymzhanov (FLNR JINR) 13'+ 2'  
Latent tracks and mechanical stresses in Al<sub>2</sub>O<sub>3</sub> irradiated with swift heavy ions

16:00-16:30 Coffee break

- 16:30 R. Botha (Univ. of Western Cape) 18' + 2'  
Radon in-air measurements within wine-cellars of the Western Cape (South Africa) and its associated exposure dosage
- 16:50 M. Mokgolobotho (Univ. of Western Cape) 13'+ 2'  
Determining the spectroscopic quadrupole moment ( $Q_s$ ) of the first  $2^+$  state in  $^{40}\text{Ar}$
- 17:05 C. Mehl (Univ. of western Cape) 13'+2'  
Developing a sorting code for Coulomb excitation data analysis
- 17:20 M. Segal (Univ. of Cape Town/iThemba LABS) 13'+2'  
Liquid Metal Ion Source Assembly for External Ion Injection into an Electron String Ion Source (ESIS)
- 17:35 Discussion of the presentations of young scientists

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Wednesday, September 23, 2015

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7:30 Excursion to Moscow, Departure from Hotel "Dubna"

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Thursday, September 24, 2015

Conference Hall

of the Flerov Laboratory of Nuclear Reactions (FLNR)

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Session(s): Nuclear Structure  
Conveners: R. Nazmitdinov, W.D. Heiss

Chairman: F. Šimkovic

- 9:00 R. Nazmitdinov (BLTP, JINR) 25'+5'  
Symmetry effects in mesoscopic systems
- 9:30 V. Nesterenko (BLTP, JINR) 25'+5'  
Deformation effects in the dipole and quadrupole giant resonances: Skyrme RPA theory and iThemba experiments
- 10:00 N. Orce (University of the Western Cape) 25'+5'  
Nuclear polarizability: the sleeping beauty of nuclear physics

10:30-11:00 Coffee break

Chairman: R. Nazmitdinov

- 11:00 P. Schuck (Orsay, France) 25'+5'  
Selfconsistent RPA meets Time-Dependent Density matrix
- 11:30 F. Šimkovic (BLTP, JINR) 25'+5'  
QRPA with non-linear operator
- 12:00 N. Arsenyev (BLTP, JINR) 18'+2'  
Complex configuration effects on properties of pygmy resonance
- 12:20 K. Raju Mukhi (Univ, of Western Cape) 18'+2'  
Coulomb excitation reorientation-effect measurements in  $^{12}\text{C}$

13:00-14:30 Lunch time

Session(s): *Physics at Underground Laboratory*  
Conveners: F. Šimkovic, S. Wyngaardt

Chairman: F. Šimkovic

- 14:30 D. Naumov (DLNP, JINR) 25'+5'  
Neutrino Physics program at the JINR
- 15:00 R. Newman (Stellenbosch U.) 18'+2'  
Towards SAUL - perspectives, progress and prospects for establishing enhanced low-level radioactivity measurement capability
- 15:20 O. Smirnov (DLNP, JINR) 18'+2'  
Neutrino geophysics
- 15:40 A. Zakharov (ITEP Moscow) 18'+2'  
Possible alternatives for models of the Galactic Centre

16:00-16:30 Coffee break

Session(s): *Condensed Matter Physics*  
Conveners: Yu. Shukrinov, A.E. Botha

Chairman: A. Povolotsky

- 16:30 Yu. Shukrinov (BLTP JINR) 20'+5'  
Theoretical Models for Superconducting Nanostructures
- 16:55 A. E. Botha (Univ. of South Africa) 20'+5'  
Chaos and Chimera States in Josephson Junctions.
- 17:20 I. Rahmonov (BLTP JINR) 20'+5'  
Numerical Study of Josephson Nanostructures Using Parallel Computing Based on Cloud Center LIT JINR
- 17:45 E. Benecha (Univ. of South Africa), R. Dawood (Cairo U.) 20'+5'  
Simulation of Topologically Nontrivial DC-SQUID
- 18:10 K. Kulikov (BLTP JINR) 20'+5'  
Josephson junction detectors for Majorana fermions

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Thursday, September 24, 2015  
Conference Hall  
of the Veksler and Baldin Laboratory of High Energy Physics (VBLHEP)  
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Session: NICA  
Conveners: A. Sorin, J. Cleymans

Chairman: A. Sorin

- 9:00 A. Sidorin (VBLHEP, JINR) 18'+2'  
NICA collider complex: challenges and perspectives
- 9:20 V. Kolesnikov (VBLHEP, JINR) 18'+2'  
Prospects for dense baryonic matter research at NICA:  
Status of the MPD
- 9:40 M. Kapishin (VBLHEP, JINR) 18'+2'

Prospects for dense baryonic matter research at Nuclotron:  
Status of the BM@N

10:00 B. Mellado (Witwatersrand) 18'+2'  
High-throughput electronics for the NICA complex and the ATLAS  
Experience

10:20-10:50 Coffee break

Chairman: J. Cleymans

10:50 J. Cleymans (Univ. of Cape Town) 18'+2'  
The physics case for the NICA project

11:10 A. Sorin (VBLHEP, JINR) 18'+2'  
Vortical structures and strange hyperon polarization in heavy-ion  
collisions

11:30 A. Muronga (Univ. of Johannesburg) 18'+2'  
Relativistic Fluid Dynamics for Heavy Ion Collisions and Astrophysics

11:50 D. Blaske (Univ. of Wroclaw) 18'+2'  
Cluster virial expansion for quark/nuclear matter within the 2PI  
formalism

12:10 A. Trunin (BLTP, JINR) 18'+2'  
Equation of State for quark-gluonic matter from  $N_f=2+1+1$  lattice QCD

12:30 M.I. Krivoruchenko (ITEP Moscow/BLTP JINR) 18'+2'  
Quantum transport in the deformation quantization framework

12:50 T. Dietel (Univ. of Cape Town) 18'+2'  
Online data processing for Multi-Purpose Detector at NICA and  
experience from ALICE

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Friday, September 25, 2015  
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10:00 Meetings of the working groups of grant holders at laboratories

13:00-14:30 Lunch time

16:00 Round Table discussion at International Conference Hall in Dubna  
S.A. Rakityansy (5')  
*Few words to the Memory of V.B. Belyaev and S. Sofianos*  
F. Šimkovic (5')  
*Symposiums: Past, presence and future*  
A. Popeko, S. Rakytianski, M. Frontasyeva, S. Pakuliak,  
R. Nazmitdinov, D. Naumov, Yu. Shukrinov, J. Cleymans  
*Reports for sessions (4' for each report)*

17:00 Closing of the Symposium