Joint Institute for Nuclear Research

FUNDAMENTAL INTERACTIONS & NEUTRONS, NUCLEAR STRUCTURE, ULTRACOLD NEUTRONS, RELATED TOPICS

XXIX International Seminar on Interaction of Neutrons with Nuclei

Organized by

Frank Laboratory of Neutron Physics, JINR, Dubna

State Key Laboratory of Intense Pulsed Radiation Simulation and Effect, NINT, China

School of Nuclear Science and Technology, Lanzhou University, China

Dubna, May 29 – June 2, 2023

Abstracts

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May 28, Sunday DUBNA Hotel

18:00 – 20:00 Registration
20:00 – 23:00 Welcome party

May 29, Monday International Conference Hall

8:30 – 9:00 Registration

Advanced neutron sources and perspective experiments

	09:00 – 09:15	**Welcome/Introduction/Greetings**	**15 min**
1	**09:15 – 09:40**	**Hassan Ahmed** Pulse research reactor IBR-3 – new reflector concept.	**25 min**
2	**09:40 – 10:05**	**Tianfu Li** Neutron facilities and their applications at China Advanced Research Reactor.	**25 min**
3	**10:05 – 10:30**	**Tianjiao Liang** Status and prospects of China Spallation Neutron Source CSNS.	**25 min**
4	**10:30 – 10:55**	**Liang Sheng** Discussion on application of High Repetitive Frequency Pulsed Neutron Sources.	**25 min**

10:55 – 11:25 Coffee break & Conference photo

5	**11:25 – 11:50**	**Jijun Zou** Accelerator-driven neutron source and its application prospect.	**25 min**
6	**11:50 – 12:15**	**Sheng Wang** Development status and prospect of Boron Neutron Capture Therapy (BNCT).	**25 min**
7	**12:15 – 12:40**	**Yigang Yang** Neutron and photon bimodal imaging method driven by a single accelerator driven neutron source.	**25 min**
8	**12:40 – 13:05**	**Kolesnikov Iaroslav** Accelerator-based neutron source VITA for measuring nuclear reaction cross sections and for irradiating advanced materials.	**25 min**

13:05 – 14:00 Lunch

9	**14:00 – 14:25**	**Doroshkevich Aleksandr** A promising neutron source based on the EG-5 accelerator at FLNP JINR.	**25 min**
10	**14:25 – 14:45**	**Yakubov Timur** Neutron fields measurements at IREN facility behind biological shielding.	**20 min**
11	**14:45 – 15:05**	**Shehada Abdullah** Modified collimator for neutron therapy applications: enhancing narrow beam detection of fast neutrons.	**20 min**
12	**15:05 – 15:25**	**Shvedunov Vasiliy** Development of electron accelerators for fundamental research and applied purposes at SINP MSU.	**20 min**
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15:45 – 16:15 Coffee break

Properties of compound states, nuclear structure

14	**16:15 – 16:40**	**Tchuvil'sky Yury** Ab initio study of energies and decay widths of neutron resonances.	**25 min**
15	**16:40 – 17:00**	**Sukhoruchkin Sergey** Electron mass as the base parameter of the Standard Model.	**20 min**
16	**17:00 – 17:20**	**Soroko Zoya** Grouping of neutron resonance positions.	**20 min**
17	**17:20 – 17:40**	**Kuznetsova Lyubov** Theoretical study of resonance elastic scattering of thermal neutrons on atomic nuclei.	**20 min**
18	**17:40 – 18:00**	**Henner Victor** Analysis of multichannel resonances with unitary Breit–Wigner and K-matrix approaches and with effective range M-matrix method.	**20 min**

May 30, Tuesday International Conference Hall

Nuclear reactor physics

19	**09:00 – 09:25**	**Liangzhi Cao** Progresses in advanced computational methods for thermal neutron scattering law data.	**25 min**
20	**09:25 – 09:50**	**Jingen Chen** Th-U fuel cycle in MSR and its simulation methods.	**25 min**
21	**09:50 – 10:10**	**Surayev Artur** Thermal model of the IGR research reactor.	**20 min**
22	**10:10 – 10:35**	**Lim Solomon** The production of the industrially significant ^{210}Po radionuclide irradiating ^{209}Bi by neutrons.	**25 min**
23		Neutronic chain reactions in bismuth salts.	
24	**10:35 – 10:55**	**Hoang Thanh-Phi Hung** Improving neutronic characteristics of nuclear fuel using burnable particles.	**20 min**
25	**10:55 – 11:15**	**Gholamzadeh Zohreh** Investigation of gamma dose changes of high-degree occupation hall of Tehran research reactor up to a few days after the LOCA accident.	**20 min**

11:15 – 11:30 Coffee break

Nuclear and related analytical techniques in environmental and material science

26	**11:30 – 11:55**	**Bin Tang** Research advances in neutron-gamma fusion logging.	**25 min**
27	**11:55 – 12:20**	**Zinicovscaia Inga** Application of nuclear and related analytical techniques in environmental studies.	**25 min**
28	**12:20 - 12:45**	**Daqian Hei** Research progress on in situ on-line measurement technology of elemental composition of PGNAA.	**25 min**

12:45 – 13:00 Online poster session #1

13:00 – 14:00 Lunch

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30	**14:25 – 14:45**	**Wengang Jiang** Research progress of E-STONE.	**20 min**
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32	**15:05 – 15:25**	**Barabanov Alexey** Transition states, *K* number and mechanism of nuclear fission.	**20 min**

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33	**15:25 – 15:50**	**Ezhov Victor** Neutron lifetime measurements: status and prospects.	**25 min**
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16:15 – 16:30 Coffee break

Physics of ultracold neutrons

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36	**16:50 – 17:10**	**Kulin German** The concept of an UCN source for a periodic pulsed reactor.	**20 min**
37	**17:10 – 17:30**	**Zakharov Maxim** A new experiment on study non-stationary neutron diffraction by surface acoustic waves.	**20 min**

Radiation transportation and simulation

38	**17:30 – 18:00**	**Zhivkov Petar** Influence of the high energy neutron cross section data of neutron induced reactions in massive targets.	**30 min**
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19:00 – 20:30 Concert

May 31, Wednesday International Conference Hall

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"Nuclear data for applied and scientific purposes"

11:15 – 12:35 Parallel session #2 (Green Hall, see details below)
"Neutron radiation effects & Intermediate and fast neutron induced reactions"

14:00 – 17:30 Parallel session #3 (Green Hall, see details below)
"Nuclear and related analytical techniques in environmental and material science"

Fundamental interactions & Symmetries in neutron induced reactions

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41	**09:20 – 9:40**	**Zhang Mofan** Experimental introduction to parity violation and time reversal asymmetry in NOPTREX.	**20 min**
42	**9:40 – 10:00**	**Bunakov Vadim** Measurements and estimates of the fundamental symmetry breaking effects.	**20 min**
43	**10:00 – 10:20**	**Fedorov Valery** On the significant enhancement of the Stern–Gerlach effect for neutron, diffracting in a crystal at Bragg angles close to the right one.	**20 min**
44	**10:20 – 10:40**	**Xiaojun Sun** Statistical theory of light-nucleus reactions and applications.	**20 min**

10:40 – 11:00 Coffee break

Neutron detection & Methodical aspects

45	**11:00 – 11:20**	**Weixin Zhou** Measurement of wide energy range neutrons with a CLYC(Ce) scintillator.	**20 min**
46	**11:20 – 11:40**	**Wei Cheng** Research on position resolution method of scintillation signal based on CNN+LSTM Network.	**20 min**
47	**11:40 – 12:00**	**Dong Zhao** Design and calibration of large field of view dual-particle time-encoded imager based on depth of interaction detector.	**20 min**
48	**12:00 – 12:20**	**Lipeng Wang** Investigation on thermal neutron scattering for Al_2O_3 filter in support of PGNAA in Xi'an Pulsed Reactor.	**20 min**

12:20 – 13:00 Online poster session #2
13:00 – 14:00 Lunch

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50	**14:20 – 14:40**	**Skoy Vadim** Neutron spin filter based on spin-exchange interaction of ^{3}He nuclei with the atoms of saturated ferromagnetic.	**20 min**
51	**14:40 – 15:00**	**Bredikhin Ivan** Russian high speed multi-channel digitizers and their possible applications for the neutron detectors research.	**20 min**

Intermediate and fast neutron induced reactions

52	**15:00 – 15:20**	**Oprea Alexandru Ioan** Angular distribution in fast neutrons induced reactions on ^{64}Zn isotope.	**20 min**
53	**15:20 – 15:40**	**Grozdanov Dimitar** Measurement of yields and angular distributions of γ-quanta from the interaction of 14.1 MeV neutrons with oxygen, phosphorus and sulfur nuclei.	**20 min**
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16:00 – 16:20 Coffee break

16:20 – 17:15 Online poster session #3

9:00 – 10:50 Parallel session #1 (Wednesday May 31, Green Hall)
"Nuclear data for applied and scientific purposes"

55	**9:00– 9:25**	**Yonghao Chen** Measurement of the key cross sections in the Th–U fuel cycle at CSNS Back-n.	**25 min**
56	**9:25 – 9:50**	**Rong Liu** Progress in measurement of fission cross sections at CSNS Back-n white neutron source.	**25 min**
57	**9:50 – 10:10**	**Changfan Zhang** Study of discrepancy phenomenon for excitation function of $^{191}Ir(n,2n)^{190g+m1+m2+8.6\%m3}Ir$.	**20 min**
58	**10:10 – 10:30**	**Fedorov Nikita** New developments in TalysLib library.	**20 min**
59	**10:30 – 10:50**	**Zhang S.** Measurement of the $^{159}Tb(n,\gamma)$ cross section at the CSNS Back-n facility.	**20 min**

11:15 – 12:35 Parallel session #2 (Wednesday May 31, Green Hall)
"Neutron radiation effects & Intermediate and fast neutron induced reactions"

60	**11:15 – 11:35**	**Zujun Wang** Experiment and simulation research of the displacement damage effects in CMOS image sensors irradiated by neutrons.	**20 min**
61	**11:35 – 11:55**	**Yuanyuan Xue** Single event transient in the pixel array of CMOS image sensor induced by neutrons.	**20 min**
62	**11:55 – 12:15**	**Shengli Chen** Neutron reaction data for neutron irradiation damage estimation.	**20 min**
63	**12:15 – 12:35**	**Bingyan Liu** Measurement and calculation of D–T neutron induced reaction cross sections.	**20 min**

14:00 – 17:30 Parallel session #3 (Wednesday May 31, Green Hall)
"Nuclear and related analytical techniques in environmental and material science"

64	**14:00 – 14:20**	**Glombotskaya Natalya** Technical and technological features and analysis of painting specifics from the Resurrection Church of the Derevyanitsky Monastery in Veliky Novgorod (Russia).	**20 min**
65	**14:20 – 14:40**	**Strokovskaya Tatiana** A study of selected Rurik dynasty burials by the NAA method.	**20 min**
66	**14:40 – 14:55**	**Simbirtseva Nina** Non-destructive investigation of fragments of mirrors (6th–3th centuries BCE) from the necropolis Volna 1 on the Taman Peninsula by neutron resonance capture analysis.	**15 min**
67	**14:55 – 15:10**	**Canpolat Gurbet** Investigation of biomass waste catalyst treated with sulphuric acid for hydrogen generation.	**15 min**
68	**15:10 – 15:25**	**Izosimov Igor** Sample analysis by laser spectroscopy, ICP-MS, RIMS and INAA.	**15 min**
69	**15:25 – 15:45**	**Lichkunova Albina** The application of tagged neutron method for elemental analysis of material on conveyors.	**20 min**
70	**15:45 – 16:00**	**Phan Luong Tuan** Using Rutherford backscattering spectroscopy to investigate ErF_3 doped CaF_2 samples.	**15 min**

16:00 – 16:20 Coffee break

71	**16:20 – 16:40**	**Zaichick Vladimir** Neutron activation analysis in medical diagnosis: current state and prospects for the future.	**20 min**
72	**16:40 – 17:00**	**Skorkin Vladimir** Activation study of the metal-organic composite using DT neutrons.	**20 min**
73	**17:00 – 17:15**	**Madadzada Afag** Optical properties and chemical composition of native-oxide layer on the surface of GaAs irradiated with noble gases.	**15 min**
74	**17:15 – 17:30**	**Ibrahim Medhat A.** Natural-based microspheres for heavy metal remediation from industrial wastewater.	**15 min**

June 1, Thursday International Conference Hall

Intermediate and fast neutron induced reactions

75	**09:00 – 09:25**	**Maslov Vladimir** ^{236}Np isomer yields in ^{237}Np(n,2n) and ^{238}U(p,3n) reactions.	**25 min**
76	**09:25 – 09:50**	**Khryachkov Vitaly** Experimental study of the fine structure in the ^{10}B(n,α)^{7}Li reaction cross section.	**25 min**
77	**09:50 – 10:10**	**Choudhary Mahesh** The covariance analysis of ^{nat}Sn(α,x)^{122}Sb nuclear reaction cross sections.	**20 min**
78	**10:10 – 10:30**	**Sharma Aman** Experimental validation of surrogate ratio method for the (n,xp) cross sections.	**20 min**
79	**10:30 – 10:50**	**Pandey Jyoti** Examination of Weisskopf–Ewing approximation for the determination of (n,α) reaction cross-sections.	**20 min**

10:50 – 11:20 Coffee break

80	**11:20 – 11:40**	**Bikchurina Marina** Measurement of cross sections for nuclear reactions of interaction of protons and deuterons with lithium at ion energies 0.4–2.2 MeV.	**20 min**
81	**11:40 – 12:00**	**Prusachenko Pavel** Measurement and analysis of the total thick target yield from ^{13}C(α,n$_0$)^{16}O reaction.	**20 min**
82	**12:00 – 12:20**	**Ruskov Ivan** Investigation of rhenium by neutrons.	**20 min**
83	**12:20 – 12:40**	**Jovancevic Nikola** The cross-section function for the ^{115}In(γ,2n)^{113}In reaction determined in the energy range up to 23 MeV.	**20 min**

12:40 – 14:00 Lunch

14:00 – 15:30 On-site poster session #1

15:30 – 16:00 Coffee

16:00 Picnic (the buses will start from "Dubna" Hotel, Moscovskaya str. 2)

June 2, Friday International Conference Hall

9:00 – 14:45 Parallel session #2 (Friday June 2, Green Hall)
"Nuclear and related analytical techniques in environmental and material science"

Nuclear fission

84	**9:00 – 9:30**	**Pyatkov Yuri** Observation of new modes of multi-body decays of ^{252}Cf(sf).	**30 min**
85	**9:30 – 9:55**	**Solodov Alex** Status and prospects of studies of (γ,f) reactions at MT-25 microtron.	**25 min**
86	**9:55 – 10:15**	**Dubey Punit** Study of neutron multiplicity in ^{232}Th(n,f) reaction using TALYS-1.96.	**20 min**
87	**10:15 – 10:50**	**Maslov Vladimir** Angular anisotropy of secondary neutron spectra in ^{232}Th+n.	**35 min**
88		Anisotropy in pre-fission neutron spectra of ^{235}U(n,f).	
89	**10:50 – 11:20**	**Kadmensky Stanislav** The virtual character of spontaneous and induced (with the participation of thermal neutrons) ternary fission of nuclei with the emission of prescission nucleons and light nuclei.	**30 min**

11:20 – 11:40 Coffee break

90	**11:40 – 12:10**	**Lubashevsky Dmitry** Theoretical approach that simultaneously describes P-even T-odd asymmetries in nuclear fission reactions by polarized neutrons with the emission of different light particles.	**30 min**
91	**12:10 – 12:35**	**Titova Larisa** Accompanied by alpha-particles ternary fission of actinides induced by thermal neutrons.	**25 min**
92	**12:35 – 13:00**	**Ahmadov Gadir** Ternary particles of Z from 1 to 6 emitted in spontaneous fission of ^{252}Cf.	**25 min**

13:00 – 14:00 Lunch

93	**14:00 – 14:25**	**Karpeshin Feodor** Revision of the analytical properties of reaction amplitude near thresholds on the example of muon-induced prompt fission.	**25 min**
94	**14:25 – 14:45**	**Berikov Daniyar** Angular distribution of prompt fission γ-rays.	**20 min**

14:45 – 15:00 Closing ceremony

Parallel session #2 (Friday June 2, Green Hall)
"Nuclear and related analytical techniques in environmental and material science"

95	**9:00 – 9:15**	**Yushin Nikita** Application of the yeast *Saccharomyces cerevisiae* for the removal of heavy metals from industrial wastewater.	**15 min**
96	**9:15 – 9:30**	**Nekhoroshkov Pavel** Elemental ratios in marine mussels for assessment of ecological characteristics.	**15 min**
97	**9:30 – 9:50**	**Elsenbawy Ahmed** Radioactivity measurements in coastal sediments along the Mediterranean Sea – Egypt.	**20 min**
98	**9:50 – 10:10**	**Nassar Noha** Environmental study for Mediterranean Sea ecosystem using seagrass and algae samples with neutron activation analysis.	**20 min**
99	**10:10 – 10:30**	**Abdo Safa** A follow-up assessment of heavy metal pollution recorded in scleractinian corals in southern Red Sea, Hodeidah, Yemen.	**20 min**
100	**10:30 – 10:50**	**Jakhu Rajan** Natural and anthropogenic contamination analysis of the sediments collected around Novaya Zemlya.	**20 min**
101	**10:50 – 11:20**	**Duliu Octavian** Assessment of soil pollution with presumably contaminating elements in Moscow recreational areas using instrumental neutron activation analysis.	**30 min**
102		On the geochemistry of the Danube River sediments (Serbian sector).	

11:20 – 11:40 Coffee break

103	**11:40 – 12:00**	**Nguyen Thi Bao My** Evaluation of metal content in BP plants grown on 23 soil samples collected from northern Vietnam.	**20 min**
104	**12:00 – 12:20**	**Culicov Otilia** The variation of elemental content and bioactive compounds of *Lactuca sativa L.* grown in the presence of multiwall carbon nanotubes functionalized with Fe and Mn oxides.	**20 min**
105	**12:20 – 12:40**	**Tran Quang-Thien** Development of a methodology for analyzing organic carbon and ^{13}C in soil and sediment samples through EA-IRMS.	**20 min**
106	**12:40 – 13:00**	**Mustafa Hussein** Assessment of heavy metal absorption by rice plants in contaminated water.	**20 min**

13:00 – 14:00 Lunch

107	**14:00 – 14:15**	**Kruglyak Anastasiya** Obtaining of initial forms for synthetic selection of drought-resistant rice crops using radiation mutagenesis on fast neutrons.	**15 min**
108	**14:15 – 14:30**	**Kravtsova Aleksandra** Chromium and zinc accumulation and translocation in root and leafy vegetables irrigated with industrial effluents – a laboratory study.	**15 min**
109	**14:30 – 14:45**	**Chaligava Omari** Moss biomonitoring of atmospheric deposition of trace elements in Georgia in 2019–2022.	**15 min**

Online poster session #1 (Tuesday May 30, 12:45 – 13:00 MSK)

110	**12:45 – 12:50**	**Jianfeng Liang** Measurement of cross section of ^{124}Xe(n,p) induced by 14.8 MeV neutron.	**5 min**
111	**12:50 – 12:55**	**Xianglei Wang** Measurement of ^{252}Cf fission fragment's mass.	**5 min**
112	**12:55 – 13:00**	**Chenhui Wang** SPICE modeling of neutron displacement damage in bipolar amplifier.	**5 min**

Online poster session #2 (Wednesday May 31, 12:20 – 13:00 MSK)

113	**12:20 – 12:25**	**Guoguang Li** Calculation and simulation of scattering intensity distribution in neutron pinhole image in the presence of air.	**5 min**
114	**12:25 – 12:30**	**Wang Song Lin** Experimental measurement of neutronic performance at neutron beam line in CSNS.	**5 min**
115	**12:30 – 12:35**	**Yapeng Zhang** Influence of different parameters on the performance of Si-PIN detector.	**5 min**
116	**12:35 – 12:40**	**Xiaodong Zhang** Neutron detector based on SiPM and CLYC.	**5 min**
117	**12:40 – 12:45**	**Zhisheng Huang** Study on the energy response of Au–Si surface-barrier detector based on LEAF.	**5 min**
118	**12:45 – 12:50**	**Upadhyay Mahima** Neutron induced reaction cross section measurement for silver with detailed uncertainty quantification.	**5 min**
119	**12:50 – 12:55**	**Mishra Utkarsha** Effect of angular momentum variation in heavy-ion induced fusion reaction.	**5 min**
120	**12:55 – 13:00**	**Shrivastava Abhinav Kumar** Mechanization for reshaping of ancient archeological design into modern structures for "safe restoration of radioactive nuclear fuel" and residue of used nuclear fuel.	**5 min**

Online poster session #3 (Wednesday May 31, 16:20 – 17:15 MSK)

121	**16:20 – 16:25**	**Khafizov Rashid** Observation of structural gamma quanta in neutron radiative decay.	**5 min**
122	**16:25 – 16:30**	**Oprea Alexandru Ioan** Forward-backward asymmetry effect in the slow neutrons capture by silver nucleus.	**5 min**
123	**16:30 – 16:35**	**Sidorova Olga** PFN multiplicity variations measurement at the IREN facility.	**5 min**
124	**16:35 – 16:40**	**Imanova Gunel** Characterization of nano-sized titanium dioxide.	**5 min**
125	**16:40 – 16:50**	**Jafarov Y.D.** Investigation of molecular hydrogen in the nano-SiO_2 (d=15–20 nm)/H_2O system under the influence of γ-quanta.	**10 min**
126		Production of molecular hydrogen (an environmentally friendly fuel) by the interaction of γ-rays with the BeO/H_2O system.	
127	**16:50 – 16:55**	**Khaligzade Aydan** The effect of gamma-irradiation on VAC of GaS monocrystal doped with Yb.	**5 min**

128	**16:55 – 17:00**	**Bekpulatov Ilkhom** Electrophysical properties of thin films Mn_4Si_7.	**5 min**
129	**17:00 – 17:05**	**Filonchik Polina** Angular correlation (n',γ) in reaction of neutron's inelastic scattering on ^{12}C.	**5 min**
130	**17:05 – 17:10**	**Ionkin Vyacheslav** Determination of the efficiency of neutron detectors in the experiment of inelastic neutron scattering on ^{12}C.	**5 min**
131	**17:10 – 17:15**	**Pampushik Grigory** Applying TalysLib library for optimization of optical potential parameters for neutron scattering on ^{24}Mg and ^{32}S.	**5 min**

On-site poster session #1 (Thursday June 1, 14:00 – 15:30 MSK)

132	**Andreev Alexander** Modelling of the setup for carbon analysis of soil sample.
133	**Batchuluun Erdemchimeg** Characteristics of isotope distributions produced in peripheral collisions at Fermi energies as a function of the projectile mass.
134	**Ergashov Almat** The development of setup for a study of p-even correlations in p-wave resonances.
135	**Galustov Vladimir** Programming of robotic arms for automatic sample change on the REGATA facility of the IBR-2 reactor.
136	**Gorelova Svetlana** Active bryomonitoring of industrial atmospheric fallout using different species of mosses.
137	**Goryainova Zoya** New time pick-off algorithm for time-of-flight measurements with PIN diodes.
138	**Kurylev Vladimir** A high-field adiabatic spin flipper for strong neutron deceleration.
139	**Le Tran Minh Nhat** Determining of thermal and resonance neutron fluxes distribution for research of nuclear data of isotopes at the IREN facility.
140	**Lobachev Valery** Pneumatic transport system REGATA-2 for neutron and gamma-activation analysis at the IREN facility at FLNP JINR: implementation and first results.
141	**Makhaldiani Nugzar** Long range quarkonium potential for exotic hadrons and nuclei.
142	**Mitsyna Liudmila** Evaluation of a mistaken asymmetry in the projected experimental search of spatial anisotropy of gammas from $^{109}Ag(n,\gamma)$ reaction at neutron energies near 32-eV p-wave resonance.
143	**Peshkova Alexandra** Accumulation and translocation of copper and gold nanoparticles in *Petroselinum crispum* segments under root irrigation conditions.
144	**Popov Alexander** The problem of neutron transport for a time-focused UCN source.
145	**Prozorova Irina** Definition of thermophysical parameters of the IGV.1M reactor core with LEU fuel.
146	**Sharapov Eduard** Theoretical works of G.C. Wick in neutron physics of 30-ies.
147	**Shvetsova Margarita** Monitoring of airborne potentially toxic elements using moss bag technique on territory of Moscow parks.
148	**Vergel Konstantin** Moss survey-2020/2021 in the regions of Central Russia.