

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

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ISINN-29 Agenda

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 Vasilii Development of electron accelerators for fundamental research and applied purposes at SINP MSU.	20 min
13	15:25 – 15:45	Lyashuk Vladimir Accelerator version of the intensive lithium antineutrino source.	20 min

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	Zinicovsaia 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

Nuclear fission

29	14:00 – 14:25	Zheng Wei Physics study of neutron-induced actinide fission and applications.	25 min
30	14:25 – 14:45	Wengang Jiang Research progress of E-STONE.	20 min
31	14:45 – 15:05	Gagarski Alexei Measurement of fission cross section and angular distributions of fission fragments from neutron-induced fission of ^{243}Am in the energy range 1–500 MeV.	20 min
32	15:05 – 15:25	Barabanov Alexey Transition states, K number and mechanism of nuclear fission.	20 min

Fundamental properties of the neutron

33	15:25 – 15:50	Ezhov Victor Neutron lifetime measurements: status and prospects.	25 min
34	15:50 – 16:15	Frank Alexander Group delay time in neutron optics and neutron wave reflection time.	25 min

16:15 – 16:30 Coffee break

Physics of ultracold neutrons

35	16:30 – 16:50	Grigoriev Pavel Possibility to decrease the losses of ultracold neutrons in material traps covered by liquid helium.	20 min
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
39		Fission induced by high energy particles and energy release in massive fissionable targets applied for ADS.	

19:00 – 20:30 Concert

May 31, Wednesday International Conference Hall

9:00 – 10:50 Parallel session #1 (Green Hall, see details below)

“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

40	09:00 – 09:20	Ruirui Fan Neutron Optics Time Reversal Experiment (NOPTREX): search for T-violation in polarized neutron transmission through polarized nuclei.	20 min
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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 ₂ O 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

49	14:00 – 14:20	Khliustin Denis TOF method measurements of neutron cross sections in 299 energy intervals of the ABBN-93 group constants.	20 min
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
54	15:40 – 16:00	Singh Nand Lal Measurement of ⁸⁵ Rb(n,2n) ^{84m} Rb reaction cross section at different neutron energies.	20 min

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 $^{191}\text{Ir}(n,2n)^{190g+n1+m2+8.6\%m3}\text{Ir}$.	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 $^{159}\text{Tb}(n,\gamma)$ 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	Yuanxuan 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 $^{237}\text{Np}(n,2n)$ and $^{238}\text{U}(p,3n)$ reactions.	25 min
76	09:25 – 09:50	Khryachkov Vitaly Experimental study of the fine structure in the $^{10}\text{B}(n,\alpha)^7\text{Li}$ reaction cross section.	25 min
77	09:50 – 10:10	Choudhary Mahesh The covariance analysis of $^{nat}\text{Sn}(\alpha,x)^{122}\text{Sb}$ 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 $^{13}\text{C}(\alpha,n_0)^{16}\text{O}$ 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 $^{115}\text{In}(\gamma,2n)^{113}\text{In}$ 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 $^{252}\text{Cf}(\text{sf})$.	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 $^{232}\text{Th}(n, f)$ reaction using TALYS-1.96.	20 min
87	10:15 – 10:50	Maslov Vladimir Angular anisotropy of secondary neutron spectra in $^{232}\text{Th}+n$.	35 min
88		Anisotropy in pre-fission neutron spectra of $^{235}\text{U}(n, f)$.	
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 precession 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 <i>Saccharomyces cerevisiae</i> 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 <i>Lactuca sativa L.</i> 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 $^{124}\text{Xe}(n,p)$ 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 ₂ O 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 ₂ O 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 <i>Petroselinum crispum</i> 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.