
CREMLINplus WP 3 Workshop:**"The IX School on Polarized Neutron Physics "FPN-2020"****IX Школа по физике поляризованных нейтронов «ФПН-2020»****10-11 December 2020****Venue: NRC "Kurchatov Institute" - PNPI****Address: 188300, Russia, Leningradskaya Oblast, Gatchina, 1, mkr. Orlova roshcha****Site: <https://oiks.pnpi.spb.ru/events/fpn2020>**

On December 10 and 11, 2020, the IX School on Physics Polarized Neutrons "FPN-2020" was held on the basis of the National Research Center "Kurchatov Institute" - PNPI. For the first time, the school was held in two formats: full-time (with a limited number of participants at the same time, in the conference hall of building 7 of PNPI) and in online format.

The School on Polarized Neutron Physics has been held annually at the Kurchatov Institute - PNPI since 2012, and is associated with the names of Gilyari Moiseevich Drabkin and Sergei Vladimirovich Maleev. For a long time, these two outstanding scientists were the organizers and inspirers of condensed matter research at our institute, mainly with the help of polarized neutrons. The created experimental and theoretical groundwork still inspires, uniting the efforts of scientists of the Condensed Matter Research Department and the Solid State Physics Sector of the Theoretical Physics Department of the Kurchatov Institute - PNPI.

The FPN-2020 School is designed to activate the activities of the Russian scientific community in the field of research using polarized neutrons and to attract young people to research activities. This year, about 50 people took part in the work of the school.

The first day of the School was marked by the reports of the participants who successfully defended their Ph.D. theses in chemistry and physics in the past year. Thus, there are two more PhDs in the Condensed Matter Research Department. The focus was on topical problems in the physics of polarized neutrons and how experiments on small-angle scattering (SAS) and polarized neutron reflectometry can solve them. Ferromagnets with the Dzyaloshinskii-Moriya interaction have become one of these problems for 4 decades already. To solve this problem, an important role was played by a special research method - measuring the spin-wave rigidity of ferromagnets and helimagnets using a polarized neutron SXR developed at our institute back in the 1980s. Young employees of the institute made a whole series of reports in which research was carried out on the basis of this method.



In addition, several reports were devoted to the installations of polarized neutrons (reflectometers and the SEMURN installation), which are currently being created at the PIK reactor for carrying out unique experiments.

On the second day of the meeting, the participants discussed experiments using polarized neutron diffraction. A special topic at the School was the reports on the phenomenon of nuclear magnetic interference in the scattering of polarized neutrons. Traditionally, the school presented reports on the development of a compact neutron source project based on the DARIA proton accelerator. The session devoted to instruments and technology of polarized neutrons turned out to be no less traditional.

The FPN-2020 School is an event within CREMLINplus WP 3 [Collaboration with PIK], Task [Task 3.7: Instrument specific education and training programs for engineers and scientists.]

Lead beneficiary: [FZJ]. Related CREMLINplus Deliverable: [MS3.1 Plan for the workshops and schools, dissemination level: public]

FPN-2020 school Program

December 10	
Session I. School of polarized neutrons in Gatchina	
Chairman: S.V. Grigoriev	
9:30 - 9:40	S. Grigoriev (PNPI, Gatchina, Russia) School opening
9:40 - 10:05	E.G. Yashina (PNPI, Gatchina; St. Petersburg State University, St. Petersburg) On the packing of chromatin in the cell nucleus: a few words about the defense of the thesis for the degree of Ph.D.
10:05 - 10:30	N.N. Gubanova (PNPI, Gatchina; ISC RAS, St. Petersburg) "Sol-gel synthesis and physical and chemical research of porous bulk and thin-film materials": a few words about the defense of the thesis for the degree of Ph.D.
10:30 - 10:50	G.P. Kopitsa (PNPI, Gatchina) Iron oxides and composite systems (SiO ₂ - CoFe ₂ O ₄) in sol-gel materials: study of polarized neutrons by the SAX method.
10:50 - 11:20	Coffee break
Session II. Actual problems for the physics of polarized neutrons: SANS	
Chairman: I.A. Zobkalo	
11:20 - 11:40	O.I. Utesov (PNPI, Gatchina) The role of antiferromagnetic interaction in helimagnets with the Dzyaloshinskii-Moriya interaction
11:40 - 12:00	S.V. Grigoriev (PNPI, Gatchina; St. Petersburg State University, St. Petersburg) Experiments on the scattering of polarized neutrons above the ordering temperature in systems with the Dzyaloshinskii-Moriya interaction
12:00 - 12:15	L.A. Azarova (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) On the measurement of energy constants in the dispersion of magnons in amorphous ferromagnets.
12:15 - 12:30	R.M. Vinogradov (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) Estimation of the energy gap in the spectrum of spin waves of an invar ferromagnetic iron-nickel alloy.



12:30 - 12:45	K.A. Pshenichny (NRC KI - PNPI, Gatchina) Is scattering by spin waves in helimagnets with the Dzyaloshinskii-Moriya interaction possible at fields less than the critical value H_c2 ?
12:45 - 14:00	Lunch
Session III. Polarized neutron reflectometry	
Chairman: N.K. Pleshakov	
14:00 - 14:30	E.A. Kravtsov (IPM UB RAS, Yekaterinburg) Magnetism of rare-earth multilayer systems.
14:30 - 14:50	V.A. Matveev (PNPI, Gatchina) Start-up and adjustment of the Polarized Neutron Reflectometer NERO-2 in the hall of horizontal experimental channels of the PIK reactor
14:50 - 15:10	M.V. Dyachkov, V.A. Ulyanov, V.G. Syromyatnikov, S.I. Kalinin, M.R. Kolkhidashvili, G.E. Shmelev (PNPI, Gatchina) Start-up and adjustment of the Test Neutron Reflectometer (TNR) in the reactor hall of the PIK reactor
15:10 - 15:40	Yu.O. Chetverikov (PNPI, Gatchina) Current status of construction of the SESANS facility at the PIK reactor
15:40 - 16:10	Coffee break
Session IV. Actual problems for the physics of polarized neutrons: coronavirus and the fight against the epidemic	
Chair: E.G. Yashina	
16:10 - 16:40	N.E. Savitskaya (PNPI, Gatchina) So shall we win? What do modern mathematical models of the spread of epidemics teach?
16:40 - 17:00	I.A. Mitropol'skiy (PNPI, Gatchina) Fuzzy logic and hybrid neural networks in the taxonomy of nuclear data
17:00 - 17:20	O.D. Shnyrkov (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) What is a logarithmic fractal; its dimension and sub-dimension?
December 11	
Session V. Actual problems for the physics of polarized neutrons: diffraction	
Chairman: Yu.P. Chernenkov	
10:00 - 10:30	I.V. Golosovsky (PNPI, Gatchina) Establishing the interface coupling in bi-magnetic core/shell nanoparticles by polarized neutron powder diffraction under the applied magnetic field
10:30 - 11:00	I.A. Zobkalo (PNPI, Gatchina) Spin density study by classical polarized neutron diffraction
11:00 - 11:20	D.O. Skachenko, A.S. Shcherbakov (PNPI, Gatchina) Formation of a skyrmion lattice in compounds based on MnGe: experimental results and theoretical background
11:20 - 11:40	Coffee break
Session VI. Actual problems for physics of polarized neutrons: spectroscopy	
Chairman: V.V. Runov	
11:40 - 12:00	A.A. Mistonov (St. Petersburg State University, St. Petersburg) Arrays of iron nanowires: what to do in the neutron queue?
12:00 - 12:20	A.A. Pavlova (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) Method of nuclear magnetic interference in polarized neutron scattering
12:40 - 14:00	A.M. Visloguzov (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) Contrasting method and interference of neutron scattering in the nucleus of a biological cell
11:30 – 11:45	Lunch
Session VII. Compact neutron source DARIA	

Chairman: P.I. Konik	
14:00 - 14:20	N.A. Kovalenko (PNPI, Gatchina) Optimization of the target assembly for a compact neutron source
14:20 - 14:50	M.V. Bulavin (JINR, Dubna) Cold moderator based on solid mesitylene for neutron sources of low and medium intensity
14:50 - 15:10	V.V. Subbotina (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) Optimization of a cold hydrogen steam moderator as part of a target assembly
15:10 - 15:30	A.E. Pavlova (St. Petersburg State University, St. Petersburg; PNPI, Gatchina) Concept of a diffractometer based on a compact neutron source
15:30 - 15:40	Break
Session VIII. Polarized neutron technique	
Chairman: I.A. Metropolitan	
15:40 - 16:10	S.V. Kozhevnikov (JINR, Dubna) Neutron spin resonance in a magnetic film
16:10 - 16:25	O.V. Usmanov (NRC KI - PNPI, Gatchina) Principle of operation and calculation of the Mesei flipper
16:25 - 16:40	A.R. Moroz (St. Petersburg State University, St. Petersburg) Use of polarized neutrons in an experiment to measure the ratio of the axial and vector weak interaction constants
16:40	Extended coffee break, certificates and gifts



Participants

No	Full name	Organization	Full name (identical to registration forms)	Organization (identical to registration forms)
1	Azarova L.A.	NRC "Kurchatov Institute" - PNPI	Азарова Л.А.	НИЦ «Курчатовский институт» - ПИЯФ
2	Axelrod L.A.	NRC "Kurchatov Institute" - PNPI	Аксельрод Л.А.	НИЦ «Курчатовский институт» - ПИЯФ
3	Bulavin M.	JINR	Булавин М.	JINR
4	Bykov A.	NRC "Kurchatov Institute" - PNPI	Быков А.	НИЦ «Курчатовский институт» - ПИЯФ
5	Vasiliev A.I.	NRC "Kurchatov Institute" - PNPI	Васильев А.И.	НИЦ «Курчатовский институт» - ПИЯФ
6	Vinogradov R.M.	St. Petersburg State University, PNPI	Виноградов Р.М.	СПбГУ, ПИЯФ НИЦ КИ
7	Visloguzova A.M.	St. Petersburg State University, PNPI	Вислогузова А.М.	СПбГУ, ПИЯФ НИЦ КИ
8	Gavrilov S.V.	NRC "Kurchatov Institute" - PNPI	Гаврилов С.В.	НИЦ «Курчатовский институт» - ПИЯФ
9	Golosovsky I.V.	NRC "Kurchatov Institute" - PNPI	Голосовский И.В.	НИЦ «Курчатовский институт» - ПИЯФ
10	Grigoriev S.V.	NRC "Kurchatov Institute" - PNPI	Григорьев С.В.	НИЦ «Курчатовский институт» - ПИЯФ
11	Grigorieva N.A.	SPbSU	Григорьева Н.А.	СПбГУ
12	Gubanova N.N.	NRC "Kurchatov Institute" - PNPI	Губанова Н.Н.	НИЦ «Курчатовский институт» - ПИЯФ
13	Devyaterikov D.I.	IPM UB RAS	Девятериков Д.И.	ИФМ УрО РАН
14	Didenko G.P.	NRC "Kurchatov Institute" - PNPI	Диденко Г.П.	НИЦ «Курчатовский институт» - ПИЯФ
15	Dyachkov M.V.	NRC "Kurchatov Institute" - PNPI	Дьячков М.В.	НИЦ «Курчатовский институт» - ПИЯФ
16	Zobkalo I.A.	NRC "Kurchatov Institute" - PNPI	Зобкало И.А.	НИЦ «Курчатовский институт» - ПИЯФ
17	Kozhevnikov S.V.	JINR	Кожевников С.В.	ОИЯИ
18	Konik P.I.	JCNS	Коник П.И.	JCNS
19	Kopitsa G.P.	NRC "Kurchatov Institute" - PNPI	Копица Г.П.	НИЦ «Курчатовский институт» - ПИЯФ
20	Kravtsov E.A.	IPM UB RAS	Кравцов Е.А.	ИФМ УрО РАН
21	Kurbakov A.I.	NRC "Kurchatov Institute" - PNPI	Курбаков А.И.	НИЦ «Курчатовский институт» - ПИЯФ
22	Likholtsova E.	NRC "Kurchatov Institute" - PNPI	Лихолетова Е.	НИЦ «Курчатовский институт» - ПИЯФ
23	Matveev V.A.	NRC "Kurchatov Institute" - PNPI	Матвеев В.А.	НИЦ «Курчатовский институт» - ПИЯФ
24	Mistonov A.A.	SPbSU	Мистонов А.А.	СПбГУ
25	Mitropol'skiy I.A.	NRC "Kurchatov Institute" - PNPI	Митропольский И.А.	НИЦ «Курчатовский институт» - ПИЯФ

26	Moroz A.R.	NRC "Kurchatov Institute" - PNPI	Мороз А.Р.	НИЦ «Курчатовский институт» - ПИЯФ
27	Nigmatullina E.K.	NRC "Kurchatov Institute" - PNPI	Нигматуллина Е.К.	НИЦ «Курчатовский институт» - ПИЯФ
28	Ovsyanikov A.K.	PNPI, RWTH Aachen University	Овсяников А.К.	НИЦ КИ ПИЯФ, RWTH Aachen University
29	Pavlov K.	NRC "Kurchatov Institute" - PNPI	Павлов К.	НИЦ «Курчатовский институт» - ПИЯФ
30	Pavlova A.A.	NRC "Kurchatov Institute" - PNPI	Павлова А.А.	НИЦ «Курчатовский институт» - ПИЯФ
31	Pavlova A.E.	St. Petersburg State University, PNPI	Павлова А.Е.	СПбГУ, ПИЯФ НИЦ КИ
32	Pleshakov N.K.	NRC "Kurchatov Institute" - PNPI	Плешанов Н.К.	НИЦ «Курчатовский институт» - ПИЯФ
33	Pshenichnaya A.G.	NRC "Kurchatov Institute" - PNPI	Пшеничная А.Г.	НИЦ «Курчатовский институт» - ПИЯФ
34	Pshenichny K.A.	NRC "Kurchatov Institute" - PNPI	Пшеничный К.А.	НИЦ «Курчатовский институт» - ПИЯФ
35	Rumyantseva D.A.	SPbSU	Румянцева Д.А.	СПбГУ
36	Runov V.V.	NRC "Kurchatov Institute" - PNPI	Рунов В.В.	НИЦ «Курчатовский институт» - ПИЯФ
37	Savitskaya N.E.	NRC "Kurchatov Institute" - PNPI	Савицкая Н.Е.	НИЦ «Курчатовский институт» - ПИЯФ
38	Salamatov Yu.A.	Institute of Metal Physics named after M. N. Mikheeva Ural Branch of RAS	Саламатов Ю.А.	Институт физики металлов им. М. Н. Михеева УрО РАН
39	Skanchenko D.O.	NRC "Kurchatov Institute" - PNPI	Сканченко Д.О.	НИЦ «Курчатовский институт» - ПИЯФ
40	Subbotina V.V.	NRC "Kurchatov Institute" - PNPI	Субботина В.В.	НИЦ «Курчатовский институт» - ПИЯФ
41	Susloparova A.	NRC "Kurchatov Institute" - PNPI	Суслопарова А.	НИЦ «Курчатовский институт» - ПИЯФ
42	Syromyatnikov V.G.	NRC "Kurchatov Institute" - PNPI	Сыромятников В.Г.	НИЦ «Курчатовский институт» - ПИЯФ
43	Ulyanov V.A.	NRC "Kurchatov Institute" - PNPI	Ульянов В.А.	НИЦ «Курчатовский институт» - ПИЯФ
44	Usmanov O.V.	NRC "Kurchatov Institute" - PNPI	Усманов О.В.	НИЦ «Курчатовский институт» - ПИЯФ
45	Utesov O.I.	NRC "Kurchatov Institute" - PNPI	Утесов О.И.	НИЦ «Курчатовский институт» - ПИЯФ
46	Utkina E.S.	NRC "Kurchatov Institute" - PNPI	Уткина Е.С.	НИЦ «Курчатовский институт» - ПИЯФ
47	Chernenkov Yu.P.	NRC "Kurchatov Institute" - PNPI	Черненков Ю.П.	НИЦ «Курчатовский институт» - ПИЯФ
48	Chetverikov Yu.O.	NRC "Kurchatov Institute" - PNPI	Четвериков Ю.О.	НИЦ «Курчатовский институт» - ПИЯФ

49	Shapiro D.D.	NRC "Kurchatov Institute" - PNPI	Шапиро Д.Д.	НИЦ «Курчатовский институт» - ПИЯФ
50	Shnyrkov O.D.	NRC "Kurchatov Institute" - PNPI	Шнырков О.Д.	НИЦ «Курчатовский институт» - ПИЯФ
51	Shcherbakov A.S.	NRC "Kurchatov Institute" - PNPI	Щербаков А.С.	НИЦ «Курчатовский институт» - ПИЯФ
52	Yuzvyuk M.	NRC "Kurchatov Institute" - PNPI	Юзвюк М.	НИЦ «Курчатовский институт» - ПИЯФ
53	Yashina E.G.	NRC "Kurchatov Institute" - PNPI	Яшина Е.Г.	НИЦ «Курчатовский институт» - ПИЯФ



Workshop Organisers:**Program Committee****Chairman**

Grigoriev Sergey Valentinovich (*NRC «Kurchatov Institute» - PNPI, SPbSU*)

Program committee members

Voronin Vladimir Vladimirovich (*NRC «Kurchatov Institute» - PNPI*)

Golosovsky Igor Viktorovich (*NRC «Kurchatov Institute» - PNPI*)

Zobkalo Igor Alexandrovich (*NRC «Kurchatov Institute» - PNPI*)

Maleev Sergey Vladimirovich (*NRC «Kurchatov Institute» - PNPI*)

Mitropolsky Ivan Andreevich (*NRC «Kurchatov Institute» - PNPI, SPbSU*)

Okorokov Alexey Ivanovich (*NRC «Kurchatov Institute» - PNPI*)

Pleshakov Nikolay Konstantinovich (*NRC «Kurchatov Institute» - PNPI*)

Tarnavich Vladislav Valerievich (*NRC «Kurchatov Institute» - PNPI*)

Organizing Committee**Chairman**

Gubanova Nadezhda Nikolaevna (*NRC «Kurchatov Institute» - PNPI*)

Secretary

Skanchenko Daria Olegovna (*NRC «Kurchatov Institute» - PNPI*)

Members of the organizing committee

Dyachkov Maxim Vadimovich (*NRC «Kurchatov Institute» - PNPI*)

Lukin Alexander Sergeevich (*NRC «Kurchatov Institute» - PNPI*)

Pshenichny Kirill Alexandrovich (*NRC «Kurchatov Institute» - PNPI*)

Kuga Natalia Alekseevna (*NRC «Kurchatov Institute» - PNPI*)

Travina Olga Aleksandrovna (*NRC «Kurchatov Institute» - PNPI*)

Nikitina Natalia Vladimirovna (*NRC «Kurchatov Institute» - PNPI*)

«GoodFoodOrlik» Ltd (ООО «ГудФудОрлик») company organized coffee breaks.

Contact person: Daria Skanchenko

E-mail: WorkshopOIKS@pnpi.nrcki.ru

