



**PROGRAM**  
**IV ANNUAL CONFERENCE OF KAZAKH PHYSICAL SOCIETY**

**Ust-Kamenogorsk, 2025.**

## **IV ANNUAL CONFERENCE OF KAZAKH PHYSICAL SOCIETY**

**June 4 – 7, 2025, Sarsen Amanzholov East Kazakhstan University**

### **Chairmen:**

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### **Co-Chairmen:**

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### **Secretary:**

*M.N. Sultangazina (Scientific Secretary of KPS),  
G.A. Toreguzhinova (Scientific Coordinator of the DSCSP “S. Amanzholov EKU”)*

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Batyrbekov E., National Nuclear Center of the Republic of Kazakhstan, Kazakhstan  
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Ramazanov T., Al-Farabi Kazakh National university, Kazakhstan  
Sagdoldina Zh., Sarsen Amanzholov East Kazakhstan university, Kazakhstan  
Saduyev N., Institute of Nuclear Physics, Kazakhstan  
Skakov M., Sarsen Amanzholov East Kazakhstan university, Kazakhstan  
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Zhilkashinova A., Sarsen Amanzholov East Kazakhstan university, Kazakhstan*

### **Local Organizing Committee**

*East Kazakhstan Region Branch of KPS  
Sarsen Amanzholov East Kazakhstan university*

## Program of KPS conference

THURSDAY (JUNE 5, 2025)		
Registration:	08:30 – 09:00	
Location of the event	Assembly Hall, Academic building No. 5, East Kazakhstan region, Ust-Kamenogorsk, Kazakhstan str., 55	
Working language	English (with simultaneous translation)	
	Exhibition of the works of the faculty and researchers, poster presentations of the conference participants on the 2nd floor	
OPENING OF THE CONFERENCE Chairman: Tlekkabul Ramazanov		
09.00 – 09.05	Mukhtar Tolegen	Rector of EKV, LOC Chairman
09.05 – 09.10	Tolegen Kozhamkulov	President of KPS
09.10 – 09.15	Didar Batryshev	Vice President of National Academy of Sciences of Kazakhstan under the President of the Republic of Kazakhstan
09.15 – 09.20	Mazhyn Skakov	LOC co-Chairman
Session 1 (09:20-11:00) Chairman: Maratbek Gabdullin		
Time	Speaker	Title
9:20 – 9:40	Laïfa Boufendi, Al-Farabi KazNU	Dust forming nonequilibrium plasma for building blocks synthesis for Nanoscience and Nanotechnology
9:40 – 10:00	Anton Desyatnikov, NU	Optical vortex rings
10:00 – 10:20	Siddharth S Saxena Cavendish Laboratory, University of Cambridge, United Kingdom	Magnetoelectric coupling of Terbium Tantalate (TbTaO4)
10:20 – 10:40	Yevgeniy Yermakov, INP	Contribution of the Institute of Nuclear Physics to the strategic and sustainable development of Kazakhstan through scientific research, development and implementation of the world-wide technologies for peaceful atomic energy
10:40 – 11:00	Saeed Nasiri, NU	High-Precision Non-Born–Oppenheimer Calculations of BH and BH+ Molecules: Towards Benchmark Accuracy in Multi-Electron Systems

**Coffee break (11:00 – 11:20)**

<b>Session 2 (11:20 – 13:00) - Chairman: Kanat Baigarin</b>		
<i>Time</i>	<i>Speaker</i>	<i>Title</i>
<b>11.20 – 11.40</b>	Maratbek Gabdullin, KBTU	Stable Photodiode Performance under Ionizing Radiation Enabled by a Self-Adaptive Nanostructured CNWs/CdZnTe Heterojunction
<b>11.40 – 12.00</b>	Sergei Kislitsin, INP	Effect of neutron irradiation in helium and hydrogen atmosphere on structure and embrittlement of austenitic structural steel
<b>12.00-12.20</b>	Azat Abdullaev, NU	Thermal Conductivity of Double Polymorph Ga <sub>2</sub> O <sub>3</sub> Structures
<b>12.20-12.40</b>	Mukhit Muratov, Al-Farabi KazNU	Ionic Core effect on Microscopic and Dynamic Properties of Dense Plasmas
<b>12.40-13.00</b>	Mazhyn Skakov, S.Amanzholov ECU	The influence of fillers on the structure and properties of ultra-high molecular weight polyethylene

**Lunch (13:00 – 14:00)****Kazakhstan st., 55**

<b>Excursion, to the centers and laboratories of universities and social activity (14:00 – 18:00)</b>		
<i>Time</i>	<i>Place</i>	<i>Address</i>
<b>14:00-15:00</b>	«Ulba Metallurgical Plant» Joint-Stock Company	Abay Av., 102
<b>15:00-16:00</b>	Limited Liability Partnership «KAZZINC»	Promyshlennaya st., 1
<b>16:00 – 17:00</b>	Academic building No. 8: - National Scientific Laboratory for Collective Use	Bitibayeva st., 8/1
<b>17:00 – 18:00</b>	Academic building No. 7: - Scientific Research Center «Surface Engineering and Tribology»; - Technopark «Shygys-Bastau».	Shakarim st., 148

**Conference dinner on behalf of the rector of ECU (19:00-21:00)****Kazakhstan st., 55**

**FRIDAY (JUNE 6, 2025)****Session 3 (09:00 – 10:45) Chairman: Vladimir Vityuk**

<i>Time</i>	<i>Speaker</i>	<i>Title</i>
<b>9:00 – 9:15</b>	Omid Farzadian, NU	Ultra-High Thermal Rectification in Asymmetric Graphene Monolayer
<b>9:15 – 9:30</b>	Yerasyl Yerlanuly, KBTU, IASIT	Nitrogen-Doped Carbon Nanowalls as Efficient Platforms for Hydrogen Peroxide Detection
<b>9:30 – 9:45</b>	Rakhymzhan Zhumadiov, KBTU	CO <sub>2</sub> Detection Using Carbon Nanowall-Based Gas Sensors
<b>9:45 – 10:00</b>	Nazym Akhanova, KBTU	Rheology of Fullerene-Containing Composites
<b>10:00 – 10:15</b>	Gaukhar Mussabek, Al-Farabi KazNU	Size-tailored Gd <sup>3+</sup> -doped carbon dots for bioimaging application
<b>10:15 – 10:30</b>	Çoruh Ali, Sakarya University, Türkiye (online)	Synthesis and characterization of Pd-doped perovskite/Vulcan XC-72 carbon nanocomposite for sustainable supercapacitor technology
<b>10:30 – 10:45</b>	Ardak Ainabayev, NU, Trinity College	High-performance p-type V <sub>2</sub> O <sub>3</sub> films by spray pyrolysis for transparent conducting oxide applications

**Coffee break (10:45 – 11:15)****Session 4 (11:15 – 13:00) - Chairman: Laifa Boufendi**

<i>Time</i>	<i>Speaker</i>	<i>Title</i>
<b>11:15 – 11:30</b>	Marzhan Sultangazina, KPS, Al-Farabi KazNU	Synthesis of nickel-graphite nano- and micro-sized powders by liquid-phase arc discharge
<b>11:30 – 11:45</b>	Sagi Orazbayev, Al-Farabi KazNU, IASIT	Obtaining superhydrophobic coatings by plasma treatment at atmospheric pressure
<b>11:45 – 12:00</b>	Manarbek Kylyshkanov, JSC UMP	Experience of UMP JSC in Research and Development of Advanced Materials for Fusion and Fission
<b>12:00 – 12:15</b>	Almasbek Utegenov, IASIT	Characterization of Nanomaterials Synthesized in Ar/C <sub>2</sub> H <sub>2</sub> DC Glow Discharge Plasma
<b>12:15 – 12:30</b>	Azamat Ashirbek, IASIT	Microdischarge dynamics of volume DBD-plasma under the natural convection airflow

<b>12:30 – 12:45</b>	Igor Sokolov, NNC	Physical model for testing structural materials of fusion reactors under plasma and thermal impact
<b>12:45 – 13:00</b>	Chokan Laumulin, KBTU, Jesus College, University of Cambridge	The ACAST Project: Green Transition and Novel Economy of Central Asia via the prism of Research, Certification and CRMs

### **Lunch (13:00 – 14:00)**

<b>Session 5 (14:00 – 15:30) - Chairman: Anton Desyatnikov</b>		
<i>Time</i>	<i>Speaker</i>	<i>Title</i>
<b>14:00 – 14:15</b>	Yernur Kuanyshbaiuly, Al-Farabi KazNU	Effect of a Wake-Field on the Dissociation of Quarkonium in Collisional Quark–Gluon Plasma
<b>14:15 – 14:30</b>	Olga Bukina, NNC	Development of the Technological Process for the IGR Reactor's Highly-Enriched Irradiated Uranium-Graphite Fuel Immobilization
<b>14:30 – 14:45</b>	Raushan Kabatayeva, INP	Theoretical studies of light nuclei structure and reactions involving light nuclei at the Institute of Nuclear Physics
<b>14:45 – 15:00</b>	Nasriddin Djienbekov, Al-Farabi KazNU	Simulation of Transport Properties of 2D, 3D charged systems and warm dense Be plasma
<b>15:00 – 15:15</b>	Aset Shaimerdenov, INP	The role of the WWR-K reactor in the development of HTGR technologies
<b>15:15 – 15:30</b>	Akatan Kydyrmolla, S.Amanzholov ECU	Microporous aerogel based on microcrystalline cellulose as a sorbent for use as a gas capacitor

### **Poster session +coffee break (15:30 – 16:30)**

<i>Speaker</i>	<i>Title</i>
Alexei Dikov, INP	Stability of the structure and phase composition of the intermetallic compound of beryllium and titanium - TiBe <sub>12</sub> under neutron irradiation
Baglan Kyrykbay, KBTU	Study of physical properties of superhydrophobic surface obtained by plasma jet

Zhanserik Ongaibergenov, Al-Farabi KazNU, IASIT	Estimation of electron temperature as a function of the discharge parameters at DC gas discharge plasma of Ar and Ar/C <sub>2</sub> H <sub>2</sub> mixture
Aiymgul Toremurat, Al-Farabi KazNU, IASIT	Interaction of atmospheric pressure plasmas with the water surface
Timur Tulenbergenov, RSE NNC RK	Plasma diagnostics during studies of plasma–material interactions on a plasma-beam facility
Kamila Ganiyeva, NU	Intense Pulsed Ion Beam for Modification of Functional Materials
Azamat Abdrakhmanov, Al-Farabi KazNU, IASIT	Synthesis of Carbon Nanomaterials PECVD in DC Discharge Plasma
Yerzhan Kashikbayev, RSE NNC RK	Study of plasma discharge of tokamak KTM
Kasymkhan Baiseitov, Al-Farabi KazNU	On the phase and group velocity in quark–gluon plasma
Zhanbolat Igibayev, IETP, Al-Farabi	Investigation of a Pulsed Plasma Thruster Using Graphite as Propellant
Tleubek Dalabayev, S.Amanzholov ECU	Developing research skills in prospective physics educators through STEM-based education
Aiym Nabioldina, S.Amanzholov ECU	Investigation of structural-phase and mechanical-tribological characteristics of thermal protective coatings based on NiCrAlY/ZrO <sub>2</sub> -Y <sub>2</sub> O <sub>3</sub>
Aida Gaipbergenova, SCCM	Preparation of highly porous activated carbon with high specific surface area from agricultural wastes
Dias Yerbolat, S.Amanzholov ECU	Development of a synthesis technology for zirconia-based composite ceramics and its influence on the phase composition, microstructure, and physico-mechanical properties
Almagul Ualikhan, Yasavi IKTU	Enhancing students' research skills through innovative STEM education methods
Nurkozha Zhaksylyk, Yasavi IKTU	The effectiveness of using STEAM projects in teaching physics: on the example of increasing interest in solar energy
Makpal Nurizinova, S.Amanzholov ECU	Developing digital educational content on tribology and integrating it into the professional training of future physics educators
Rinat Kurmangaliyev, Shakarim University	Electrophysical Aspects of Current Density Distribution and Its Role in Electrolyte Boiling and Surface Hardening During Electrolytic Plasma Processing
Lazzat Yerimbetova, RIETP	Ionization potential lowering in the framework of the generalized chemical model
Moldir Bayandinova, S.Amanzholov ECU	The influence of fillers on the structure and properties of ultra-high molecular weight polyethylene

Nazym Sagiyeva, S.Amanzholov ECU	Synthesis of nanocomposite based on modified nanocellulose
Tilek Kuanishbekov, S.Amanzholov ECU	Green synthesis of graphene-like structures by electrochemical exfoliation
Dana Bolatkan, S.Amanzholov ECU	Antibacterial nanocomposite material based on bentonite clay
Daur Kakimzhanov, «PlasmaScience» LLP	Effect of pulse-plasma treatment on the properties of Cr <sub>3</sub> C <sub>2</sub> -NiCr detonation coatings
Merkhat Dautbekov, «PlasmaScience» LLP	Detonation Spraying Technology for the Formation of Wear- and Corrosion-Resistant Coatings on Critical Components of Power Generation Equipment
Aidar Kengesbekov, «Institute of Composite Materials» LLP	Properties of FeCrAl coatings obtained by plasma-spraying method
Amina Nokanova, S.Amanzholov ECU	Structural and Property Modification of Oxide-Beryllium Ceramics Induced by Electron Irradiation
Akdaulet Baikaliyev, Al-Farabi KazNU	Synthesis of Chondrule-like particles in a plasma environment
Kylyshbek Turlybekuly, INP	Concept of the UCN Source at the WWR-K Reactor (ALSUN)
Eldar Zhakanbayev, INP	Magnetron technology for preparation of tape superconductors with Nb <sub>3</sub> Ge coating
Rinat Kussainov, Shakarim University	Effect of electrolytic-plasma hardening on the microstructure hardness and tribological properties of 45 steel
Amantayeva Amangul ARU	High-Luminosity Gridless Cylindrical Energy Analyzer with Axisymmetric Electrostatic Focusing

#### **Session 6 (16:30 – 18:00) - Chairman: Mazhyn Skakov**

<i>Time</i>	<i>Speaker</i>	<i>Title</i>
16:30 – 16:45	Timur Zholdybayev, INP	Continuous spectra of light charged particles from interaction of 22 and 30 MeV energy protons with nuclei
16:45 – 17:00	Aigerim Tazhen, Al-Farabi KazNU	Surface Damage of Tungsten under Pulsed Plasma Exposure
17:00 – 17:15	Sardor Kambarbekov, Yasavi IKTU	Investigation of the effect of HVOF deposition modes on the microhardness of Cr <sub>3</sub> C <sub>2</sub> -NiCr coatings on zirconium alloy E110
17:15 – 17:30	Meruyert Maulet, S.Amanzholov ECU	Investigation of the High-Temperature Resistance of Ni-Cr-Al Coatings Obtained by the Detonation Spraying Method



17:30 – 17:45	Nurtoleu Magazov NJSK "East Kazakhstan Technical University named after D. Serikbayev"	Development of Technologies for Spraying Protective Coatings and Surface Modification for Mechanical Engineering Components
17:45 – 18:00	Yedilzhan Kambarov, S.Amanzholov ECU	Increasing wear resistance of ploughshare by electrofriction treatment

**Closing ceremony (Maratbek Gabdullin, Mazhyn Skakov)**

**Dinner (19:00-21:00) Kazakhstan street, 55**

**Saturday (June 7, 2025)**

**Departure day**