

# **Bogolyubov Kyiv Conference "Problems of Theoretical and Mathematical Physics"**

**Tuesday 24 September 2024 - Thursday 26 September 2024**

**Bogolyubov Institute for Theoretical Physics (Section 1-4), Institute of Mathematics (Section 5)**

## **Scientific Programme**

**Sections 1-4**

**Tuesday, September 24**

**09-00** Registration

**10-00** *Conference opening*

20 min Academician of the NAS of Ukraine Anatoly Zagorodny

**Morning Session**

**10-20** Mark Gorenstein

30+10 min "Critical point in system of interacting bosons"

*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**11-00** Yuriy Holovatch

30+10 min "Reading Ernst Ising's dissertation hundred years on"

*Institute for Condensed Matter Physics of the NAS of Ukraine, Lviv*

**11-40** Khrystyna Gnatenko

20 min "Properties of multi-qubit states representing directed graphs and their studies with quantum programming"

*Ivan Franko National University of Lviv*

12-00 **COFFEE BREAK**

**12-30** Larissa Brizhik

20 min "To 190 years of the Wave of Translation and 50 years of the Davydov's soliton: Soliton dynamics in an oscillating magnetic field"

*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**12-50** Ivan Gandzha, Yuri Sedletsky

20 min "Cubic-quintic interplay in the nonlinear Klein–Gordon model"

*Institute of Physics of the NAS of Ukraine*

**13-10** Andriy Kuzmak

20 min "Entanglement of the diamond spin cluster"

*Ivan Franko National University of Lviv*

13-30 LUNCH

Afternoon Session

**14-30** Olexander Chalyi, L. A. Bulavin, K. O. Chalyy  
30+10 min "Methods of Neutron Optics for Studying Physical Properties of Liquids"

*O.O. Bogomolets National Medical University, Kyiv*

**15-10** Sergiy Perepelytsya  
20 min "Effects of metallic and molecular counterions in structural dynamics of the DNA double helix"

*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**15-30** Viktor Pergamenshchik  
20 min "General hydrodynamic approach for a cold Bose gas"

*Institute of Physics, NANU, Kyiv & Center for Theoretical Physics, PAN, Warsaw, Poland*

**15-50 COFFEE BREAK**

**16-10 Posters Presentation**

**18-00 Posters Discussion**

**18-30 CONFERENCE DINNER**

***Wednesday, September 25***

**Morning Session**

**10-00** Taras Bryk  
30+10 min "On a crossover between two mechanisms of sound propagation in liquids"

*Institute for Condensed Matter Physics of the NAS of Ukraine, Lviv*

**10-40** Volodymyr Kryvoruchko, Andrey Savchenko  
30+10 min "Quantum topological effects in magnetization dynamics: the Berry phase, the Aharonov–Casher effect and electric field control of spin waves dynamics"

*Donetsk Physics & Technology Institute named after O. O. Galkin, NAS of Ukraine*

**11-20** Dmytro Shapoval, Maxym Dudka, Yuriy Holovatch  
20 min "Critical Behavior of Structurally Disordered Systems Magnets with Long-Range Interaction"

*Institute for Condensed Matter Physics of the NAS of Ukraine, Lviv*

**11-40** Taras Hutak  
20 min "Thermodynamics of the kagome Heisenberg antiferromagnets"

*Institute for Condensed Matter Physics of the NAS of Ukraine, Lviv*

**12-00 COFFEE BREAK**

**12-30** Roman Ovsiannikov, Kurt Jacobs, Denys Bondar, Andrii Sotnikov  
20 min "Squeezing and amplification in open quantum systems with color centers using the multilevel Janes-Cummings model"  
*National Science Center "Kharkiv Institute of Physics and Technology*

**12-50** Yevhenii Trotskyi, Eugen Syrkin, Viktor Lykah  
20 min "Domains and domain boundaries structure of benzene adsorbed on graphene"  
*B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv, Ukraine*

**13-10** Oleh Ivakhnenko, Olexandr Todrin, Sergey Shevchenko  
20 min "Modeling temperature dynamics in non-uniform biological tissues under cryogenic impact"  
*B. Verkin Institute for Low Temperature Physics and Engineering, Kharkiv*

**13-30 LUNCH**

**Afternoon Session**

**14-30** Yurii Slyusarenko, Mykyta Bulakhov, Oleksandr Peletminskyi  
30+10 min "Effect of the photon subsystem on the magnetic properties of quantum gases in equilibrium with radiation"  
*National Science Center "Kharkiv Institute of Physics and Technology"*

**15-10** Leonid Christophorov  
20 min "Resetting random walks in a bounded chain"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**15-30** Oleksandr Borysenko, Mykhailo Bratchenko, Alessandro Lomi, Ihor Omelchenko, Andrii Sotnikov  
20 min "Application of Langevin dynamics for optimization in machine learning tasks"  
*National Science Center "Kharkiv Institute of Physics and Technology"*

**15-50 COFFEE BREAK**

**16-20** Dmytro Anchyshkin  
20 min "Four types of phase transitions in interacting boson system at high temperatures"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**16-40** Artemiy Lysenko  
20 min "Chemical freeze-out curve in heavy-ion collisions and the QCD critical point"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

## 17-00 EXCURSION TO FEOFANIA PARK

**Thursday, September 26**

### Morning Session

**10-00** Eugene Eliseev, Anna Morozovska  
20 min "Analytical Description of Size Effects, Strains and Ferro-ionic Coupling in Si-Compatible Nanosized Ferroelectrics"  
*Institute of Physics of the NAS of Ukraine*

**10-20** Andrii Fesh, Yuri Shtanov, Sergei Sharapov  
20 min "Sagnac effect in solids"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**10-40** Daryna Bukatova, Oleksii Yanchyshen, Yaroslav Zolotaryuk  
20 min "Impurity-induced localized modes in parallel Josephson junction arrays"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**11-00** Tatiana Shatnii, Evgen Len, Tatiana Len  
20 min "Recursive Method for Calculating T-Matrix of Electron Scattering on Arbitrary Many-Particle Clusters in Strongly Correlated Systems"  
*G. V. Kurdyumov Institute for Metal Physics*

**11-20** Oleksandr Vidybida  
20 min "Stimulating excitable membrane of ORN with stochastic Markov process"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**11-40** Oleksiy Vakhnenko  
20 min "Development and analysis of novel integrable nonlinear dynamical systems on quasi-one-dimensional lattices. Parametrically driven nonlinear system of pseudo-excitations on a two-leg ladder lattice"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

### 12-00 COFFEE BREAK

**12-30** Viktor Gerasimenko  
20 min "Dynamics of correlations of many colliding particles"  
*Institute of Mathematics of the NAS of Ukraine*

**12-50** Oleksiy Kapitanchuk, Elmar Petrov, Yevgen Shevchenko  
20 min "Kinetic model of the formation of STM-induced electrofluorochromism in molecular junctions"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**13-10** Oleksandr Cherniak, Bohdan Lev  
20 min "Polarization mechanism of bacteria motion in aquatic media"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

13-30 **LUNCH**

**14-30** Oleg Gerasymov  
20 min "Towards relations between compaction and compressibility of hard sphere mixtures"  
*Odesa Mechnikov National University*

**14-50** Borys Grinyuk  
20 min "Elastic form factors of light alpha-cluster nuclei"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**15-10** Nursultan Kalzhigitov, Victor Vasilevsky  
20 min "Pauli resonances in single- and many-channel systems"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

15-30 **COFFEE BREAK**

**15-50** Serhii Kukhtaruk, Viacheslav Kochelap  
20 min "Initial value problem in the case of multivalued dispersion equations"  
*V. E. Lashkaryov Institute of Semiconductor Physics*

**16-10** Marina Ishchenko, Peter Berczik, Margaryta Sobolenko  
20 min "Milky Way globular clusters in cosmological timescale. Probability of the interaction with the Galactic center"  
*Main Astronomical Observatory the NAS of Ukraine, Kyiv, Ukraine*

**16-30** Oleksii Yanchyshen  
20 min "Orbital perturbation theory in Schwarzschild space-time"  
*Bogolyubov Institute for Theoretical Physics of the NAS of Ukraine*

**16-50** Closing of the conference

## **HIGH ENERGY PHYSICS AND NUCLEAR MATTER**

## **STATISTICAL PHYSICS AND KINETIC THEORY**

## **ASTROPHYSICS AND COSMOLOGY**

## **CONDENSED MATTER PHYSICS**

## **MATHEMATICS**