

2025 Symposium on Advanced Functional Materials in Quantum and Optoelectronics



Organized By:

- School of Physics, Beijing Institute of Technology (BIT)
- Center for Advanced Mesoscience and Nanotechnology,
Moscow Institute of Physics and Technology (MIPT)

July 16-19, 2025

Program for 2025 Symposium on Advanced Functional Materials in Quantum and Optoelectronics

July 16-19, 2025, BIT, Beijing, China

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| Wednesday, July 16, 2025 | | |
| Location: Beijing Northern Spring Conference Center | | |
| 10:00-18:00 | Conference Check-in and Registration | |
| 18:00-19:30 | Welcome Reception | |
| Thursday, July 17, 2025 | | |
| Location: Wencui Building, Round Conference Hall | | |
| Session Chair: Xiang LI | | |
| 9:00-9:05 | Opening Ceremony | |
| 9:05-9:10 | Xiang LI | Introduction to School of Physics |
| 9:10-9:15 | Vasily STOLYAROV | Introduction to MIPT |
| 9:15-9:20 | Xiang LI | Present the Appointment Letter of Guest Professor |
| 9:20-9:40 | Sergey NIKITOV | Impact of Russian Scientists into the Victory in World War II (Kotelnikov) |
| 9:40-10:10 | Sergey NIKITOV | Antiferromagnetic Spintronics and Magnonics |
| 10:10-10:40 | Coffee Break & Take Photos | |
| Session Chair: Aleksandr GOLUBOV | | |
| 10:40-11:00 | Vasily STOLYAROV | Ballistic Transport in Nanocrystals of Topological Insulators |

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| 11:00-11:20 | Feng LI | 3D Fully Polarized Topological Mechanical Insulator |
| 11:20-11:40 | Mikhail TALANOV | From Symmetry to Function: Universal Distortion Principles Guiding Perovskite Optoelectronic Design |
| 11:40-12:00 | Yao GUO | Scaling Ferroelectricity Down With van der Waals Interface: Physics, Device, System |
| Lunch at Dining Hall | | |
| Session Chair: Vasily STOLYAROV | | |
| 14:00-14:20 | Viacheslav NEVEROV | Machine Learning Prediction of the Superconducting Pairing Potential for Disordered s-wave Superconductors |
| 14:20-14:40 | Haizhong GUO | Novel Properties of Low-Dimensional Quantum Materials Tuned by External Fields |
| 14:40-15:00 | Alexander MELNIKOV | Photogalvanic Phenomena in Superconductors and Hybrid Superconducting Systems |
| 15:00-15:20 | Yuhui CHEN | Integrated Optical Quantum Memories Based on Bound States in the Continuum |
| 15:20-15:40 | Elena ZHUKOVA | Superconducting $\text{Mo}_{1-x}\text{Re}_x$ Films: Terahertz Electrodynamics and Use as Reflectors for High-Q Terahertz Fabry-Perot Resonators |
| 15:40-16:00 | Shaobo CHENG | Neuromorphic Computing in Transition Metal Sulphides |
| 16:00-16:20 | Coffee Break | |
| Session Chair: Yuhui CHEN | | |

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| 16:20-16:35 | Qiman ZHANG | Reconfigurable Optoelectronic Properties Based on 1T-VSe ₂ /2H-MoTe ₂ Schottky Junction |
| 16:35-16:50 | Mark NAUMOV | Superconducting Properties of the Indium-Doped Topological Insulator SnBi ₂ Te ₄ |
| 16:50-17:05 | Shaoguang ZHAO | Optical Synaptic Devices with Multiple Encryption Features Based on SERS-Revealed Charge-Transfer Mechanism |
| 17:05-17:20 | Dmitrii KALASHNIKOV | Nonreciprocal Phenomena in the Asymmetric Superconducting Interferometer With External Microwave Irradiation |
| Dinner at Dining Hall | | |

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| Friday, July 18, 2025 | | |
| Location: Wencui Building, Round Conference Hall | | |
| Session Chair: Mikhail TALANOV | | |
| 9:00-9:30 | Fan YANG | Pairing Mechanism in the Nickle Based High-temperature Superconductivity |
| 9:30-10:00 | Anatolii SIDORENKO | Superconducting Base Elements for Brain-Inspired Neural Networks: Spintronic Innovations for Neuromorphic Computer |
| 10:00-10:30 | Coffee Break | |
| Session Chair: Fan YANG | | |
| 10:30-10:50 | Irina BOBKOVA | Gate-controlled Proximity Effects in Superconductor/Ferromagnet Heterostructures |
| 10:50-11:10 | Linfeng SUN | 2D Neuromorphic Intelligent Materials and Devices |
| 11:10-11:30 | Aleksandr BOBKOV | Anomalous Josephson Effect <i>via</i> Magnets With Strong Spin-orbit Coupling |
| 11:30-11:50 | Cuicui LU | Topological Rainbow Devices: Physics and Applications |
| Lunch at Dining Hall | | |
| Session Chair: Irina BOBKOVA | | |
| 14:00-14:20 | Denis VODOLAZOV | Negative Differential Resistance in Perforated Superconductors |
| 14:20-14:40 | Jie CHEN | From NaOsO ₃ to KOsO ₃ : Structural and Physical Property Evolution in Osmate Perovskites |

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| 14:40-15:00 | Liudmila ALIABEVA | Subterahertz FMR Frequency and Coercivity Control in Hexaferrites |
| 15:00-15:20 | Shoujun ZHENG | Two-Dimensional van der Waals Heterostructures and Their Ferroelectric and Photovoltaic Applications |
| 15:20-15:40 | Krasavin ANDREY | Vortices in Superconducting Material with a Quasicrystal Structure |
| 15:40-16:00 | Coffee Break | |
| Session Chair: Jie CHEN | | |
| 16:00-16:15 | Konstantin POLEVOI | Promising Submicron Nb and Al Based Josephson Junction for Superconducting Circuits |
| 16:15-16:30 | Yuhao WANG | Miniaturized Single-Photon Level Computational Imaging System <i>via</i> Meta-Optics |
| 16:30-16:45 | Anna ELISTRATOVA | Experimental Implementation of Elements of Superconducting Bio-like Neurons Based on Nb/Au/Nb Josephson Junctions |
| 16:45-17:00 | Polina KUZNETSOVA | Research of Superconducting Properties of S/NFN/S-Structures Based on Segmented Nanowires |
| Dinner at Dining Hall | | |

| Saturday, July 19, 2025 | | |
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| Building: Wencui Building, Round Conference Hall | | |
| Session Chair: Konstantin MOTOVILOV | | |
| 9:00-9:30 | Jiahua DUAN | Nano-optics in Anisotropic Materials: Manipulate Light-matter Interactions at the Nanoscale |
| 9:30-10:00 | Aleksandr GOLUBOV | Full Counting Statistics for Unconventional Superconductor Junctions |
| 10:00-10:30 | Coffee Break | |
| Session Chair: Jiahua DUAN | | |
| 10:30-10:50 | Konstantin MOTOVILOV | Prospects of Bioorganic Materials in Spintronics and Optoelectronics on the Example of Melanins |
| 10:50-11:10 | Dongfei WANG | Tailoring Quantum States in Low-Dimensional Nanographenes on Surfaces |
| 11:10-11:30 | Alexey ALADYSHKIN | Magnetic Force Microscopy Versus Scanning Vortex Microscopy: Probing Pinning Landscape in Granular Niobium Films |
| 11:30-11:50 | Chong WANG | Pressure-Tunable Hyperbolic Plasmons in Black Phosphorus Films |
| Lunch at Dining Hall | | |
| Session Chair: Aleksandr BOBKOV | | |
| 14:00-14:20 | Aleksei VAGOV | Localization in Materials with Several Conducting Bands to Enhance Superconductivity |

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| 14:20-14:40 | Wei JIANG | Three-Dimensional Multiorbital Flat Band Models and Materials |
| 14:40-15:00 | Tairzhan KARABASSOV | Ground State and Diode Effect in Superconducting Helical Systems |
| 15:00-15:30 | Closing Ceremony and Awards | |
| 15:30-17:00 | Free Discussion | |

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