國際暑期學校

2024 INTERNATIONAL SUMMER SCHOOL

Organized By:

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

July 15 -24, 2024

北京理工大学国际暑期学校活动安排计划表

PROGRAM
OF THE INTERNATIONAL SUMMER SCHOOL

July 15-24, 2024, BIT, Beijing, China

时间	活动安排	主讲人
July 15th	***1. Morning: (8:00-9:35)*** (2 class hours) **Fundamental of magnetism and spintronics. Exchange interaction** ***2. Morning: (9:55-12:20)*** (3 class hours) **Tunneling and scattering in quantum mechanics. Scattering matrix, transfer matrix.** ***3. Afternoon: (13:20-14:55)*** (2 class hours) **Superconducting hybrid structures: basic physics and applications** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Fundamental of magnetism and spintronics. Magnetism in the framework of the Weiss model. Magnons**	**1. Prof. Irina Bobkova** **2. Prof. Alexei Aladyshkin** **3.Prof. Alexander Golubov** **4. Prof. Irina Bobkova**
July 16th	***1. Morning: (8:00-9:35)*** (2 class hours) **Particle in quantum well/wells. Quantum-size effect. Resonant tunneling.** ***2. Morning: (9:55-12:20)*** (3 class hours) **Fundamental of magnetism and spintronics. Magnetic anisotropy.**	**1. Prof. Alexei Aladyshkin** **2. Prof. Irina Bobkova**

	3. Afternoon: (13:20-14:55) (2 class hours) **Symmetry-based approaches to materials science problems: classification of structures, phase transitions and structure-property relationships** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Quasiclassical WKB approximation. Bohr-Sommerfeld quantization rule. Kemble formula.**	**3. Prof. Mikhail Talanov** **4. Prof. Alexei Aladyshkin**
July 17th	***1. Morning: (8:00-9:35)*** (2 class hours) **Quasi-stationary states in quantum mechanics. Alpha-decay.** ***2. Morning: (9:55-12:20)*** (3 class hours) **Fundamental of magnetism and spintronics. Domains. Domain walls.** ***3. Afternoon: (13:20-14:55)*** (2 class hours) **Quantum dots as building blocks for quantum informatics** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Project work. Projects on magnetism, spintronics and tunneling phenomena. Students are invited to solve interesting scientific problems under the individual supervision**	**1. Prof. Alexei Aladyshkin** **2. Prof. Irina Bobkova** **3.Prof. Alexei Vagov** **4. Assistants: Grigorii Bobkov, Anastasia Ianovskaya, Valeria Gordeeva, Radik Tyumenev, Artem Soloviev, Semen Larionov**
July 18th	1***. Morning: (8:00-9:35)*** (2 class hours) **Tunneling in normal-metal junctions. Tunneling conductivity. Field emission.**	**1. Prof. Alexei Aladyshkin**

	2. Morning: (9:55-12:20) (3 class hours) **Fundamental of magnetism and spintronics. Magnetization dynamics. LLG equation. FMR. Domain walls motion.** ***3. Afternoon: (13:20-14:55***) (2 class hours) **Self-organization and emerging complexity: spontaneous patterns in superconductors** ***4. Afternoon: (15:15-17:40)*** **Project work** (3 class hours)	**2. Prof. Irina Bobkova** **3.Prof. Arkady Shanenko** **4. Assistants**
July 19th	***1. Morning: (8:00-9:35)*** (2 class hours) **Scanning tunneling microscopy and spectroscopy. Quantum-size effects in tunneling. Spin-dependent tunneling in ferromagnetic contacts. Tunneling magnetoresistance.** ***2. Morning: (9:55-12:20)*** (3 class hours) **Project work** ***3. Afternoon: (13:20-14:55)*** (2 class hours) **Scanning Tunneling Microscopy: real experimental results** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Project work**	**1. Prof. Alexei Aladyshkin** **2. Assistants** **3. Prof. Vasiliy Stolyarov** **4. Assistants**
July 20-21th	**Excursions in Bejing&Surroundings for teachers and students**	**all MIPT teachers&students**

July 22 th	***1. Morning: (8:00-9:35)*** (2 class hours) **Project work** ***2. Morning: (9:55-12:20)*** (3 class hours) **Project work** ***3. Afternoon: (13:20-14:55)*** (2 class hours) **Magneto-optical materials for optical applications: Bi:YIG made by metal-organic decomposition and crystallized by laser annealing, and gasogyrochromism in oxidized permalloy** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Project work**	**1. Assistants** **2. Assistants** **3. Prof. Alexander Baryushev** **4. Assistants**
July 23rd	***1. Morning: (8:00-9:35)*** (2 class hours) **Project work** ***2. Morning: (9:55-12:20)*** (3 class hours) **Project work** ***3. Afternoon: (13:20-14:55)*** (2 class hours) **Superconducting Base Elements for Artificial Neural Networks** ***4. Afternoon: (15:15-17:40)*** (3 class hours) **Project work**	***1. Assistants*** ***2. Assistants*** ***3. Prof. Anatolie Sidorenko*** ***4. Assistants***

July 24th	***1. Morning: (8:00-9:35)*** (2 class hours) **Project conference** **2. Morning: (9:55-12:20)** (3 class hours) **Project conference** **3. Afternoon: (13:20-14:55)** (2 class hours) **Photoemission methods for studying the electronic and spin structure of materials** **4. Afternoon: (15:15-16:40)** (2 class hours) **Presentation of Certificates**	***1. All professors and assistants*** ***2. All professors and assistants*** ***3. Prof. Dmitrii Usachev***