



## PROGRAM BOOK

# The 13<sup>th</sup> APCTP Workshop on Multiferroics

October 10-13 2022

Southeast University, Nanjing, China



apctp



国家自然科学基金委员会  
National Natural Science Foundation of China



## Host

- Southeast University

## Sponsors

- Asia Pacific Center for Theoretical Physics (APCTP)
- National Nature Science Foundation of China (NSFC)
- KouShare: the global scientific knowledge sharing

## Chairs

- Ce-Wen Nan                      Tsinghua University, China
- Sang-Wook Cheong              Rutgers University, USA

## Local Organizers

- Shuai Dong                      Southeast University, China
- Jun-Ming Liu                      Nanjing University, China

## Local Secretaries

- Jin Peng                          Southeast University, China
- Yang Zhang                      Southeast University, China
- Ziye Lu                              Southeast University, China
- Yiming Gao                      Southeast University, China
- Di Zhou                              Southeast University, China

## Website

- Official website of workshop
- Living broadcast provided by KouShare





## Welcome

Dear Participants,

On behalf of the Organization Committee, we warmly welcome you to attend the 13th APCTP Workshop on Multiferroics, hosted by Southeast University at Nanjing, China.



The Asia Pacific Center of Theoretical Physics (APCTP) Workshop on Multiferroics started in Pohang, Korea since 2008, which was then held annually in the Asia-Pacific countries and regions on a rotation. As an annual conference series, it has been successfully held for 12 times in the past years. Benefited from the professionalism, academicism, and high-level speakers/attendees, this workshop series has become one of the most influencing events in the community of multiferroic physics and materials, and attracts academic attendees from worldwide (not limited to the Asia-Pacific region now).

This year's workshop will continue the success and features. There have been 120 registered attendees, including 25 from abroad. After two decades of development since the revival of multiferroics and magnetoelectricity, this community has been fully diversified, not limited to the original definition of “multi” plus “ferroics”. Emergent topics on various new ferroic systems and unconventional magnetoelectric physics have been growing up as new hot spots, which would be covered in this workshop. It is the first time for this workshop to programme parallel sessions so that more speakers and presenters can be accommodated, as an indication of booming frontiers.

This workshop will not only be a platform to broadcast the cutting-edge progresses in multiferroic physics and materials, but will also provide a great opportunity for domestic young scholars and students to communicate with world-leading experts. The research level of related fields in Asia Pacific countries & regions, as well as the international academic reputation of physical discipline of Southeast University will be strongly promoted.

Due to the travel limitation imposed by the COVID-19 pandemic, it is a pity that this year all the sessions will continue to be held in the online mode, although the committee did try our best for organizing an on-site conference. We sincerely wish this workshop will be held in-person next year!

Shuai Dong  
on behalf of all local organizers



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# Conference Agenda

Zoom links for attendees:

Room A: Meeting ID: 803 827 7041 Passcode: 646067;  
 Room B: Meeting ID: 917 5450 7418 Passcode: 829734;  
 Room C: Meeting ID: 214 505 0489 Passcode: 301354;

## Oct. 11th

	Opening	Room A	Chair: <b>Shuai Dong</b> Southeast University
8:30-8:40	Welcome		<b>Litao Sun</b> Vice Chancellor of Southeast University
<b>Session A</b>	<b>Keynote</b>	Room A	Chair: <b>Jun-Ming Liu</b> Nanjing University
8:40-9:25	<b>Topological surface magnetism of linear magnetoelectrics</b>		<b>Sang-Wook Cheong</b> Rutgers University
Coffee break			
<b>Session B1</b>	Ferrites	Room A	Chair: <b>Jiagang Wu</b> Sichuan University
9:50-10:20	Some new progresses in (Bi,R)FeO <sub>3</sub> and h-RFeO <sub>3</sub> multiferroic ceramics		<b>Xiang-Ming Chen</b> Zhejiang University
10:20-10:50	Critical ionic transport across an oxygen-vacancy ordering transition in Ca-doped BiFeO <sub>3</sub>		<b>Chan-Ho Yang</b> Korea Advanced Institute of Science and Technology
10:50-11:20	Coupling of magnon and phonon-polariton in multiferroic BiFeO <sub>3</sub>		<b>Takuya Satoh</b> Tokyo Institute of Technology
11:20-11:40	Reliable construction of charged domain walls in BiFeO <sub>3</sub> nano-island array and the device applications		Jing Wang Beijing Institute of Technology
<b>Session B2</b>	vdW multiferroics	Room B	Chair: <b>Wei Ren</b> Shanghai University
9:50-10:20	Multiferroic van der Waals magnets		<b>Je-Geun Park</b> Seoul National University
10:20-10:50	Ferroelectricity and multiferroicity going 2D		<b>Junling Wang</b> Southern University of Science and Technology
10:50-11:20	Two-dimensional ferroelectric memory devices for novel computing paradigms		<b>Fei Xue</b> Zhejiang University
11:20-11:50	2D ferroelectricity and device application		<b>Fucui Liu</b> University of Electronic Science and Technology
<b>Session B3</b>	Domains	Room C	Chair: <b>Jinxing Zhang</b> Beijing Normal University

9:50-10:20	HAADF-STEM study of domain structures and domain walls in ferroelectric materials	<b>Shigeo Mori</b> Osaka Metropolitan University
10:20-10:50	Ferroelectric domain wall memory and transistor	<b>Anquan Jiang</b> Fudan University
10:50-11:20	Manipulation of ferroic topological domain structures	<b>Xingsen Gao</b> South China Normal University
11:20-11:50	Topological domains in ferroelectric thin films	<b>Deyang Chen</b> South China Normal University
Lunch break		
<b>Session C1</b>	Suspending films <span style="float: right;">Room A</span>	Chair: <b>Yuewei Yin</b> University of Science and Technology of China
14:00-14:30	Freestanding magnetoelectric membranes and devices	<b>Ming Liu</b> Xi'an Jiaotong University
14:30-15:00	Novel phases and applications of ferroelectric perovskite oxide membranes	<b>Yuefeng Nie</b> Nanjing University
15:00-15:30	Spin-lattice entanglement in ferroelastic cobaltites	<b>Er-Jia Guo</b> Institute of Physics, Chinese Academy of Science
<b>Session C2</b>	Magnetoelectricity <span style="float: right;">Room B</span>	Chair: <b>Young Sun</b> Chongqing University
14:00-14:30	Electric-field control of magnetism in multiferroic heterostructures	<b>Yonggang Zhao</b> Tsinghua University
14:30-15:00	Electrical control of antiferromagnetic moments	<b>Cheng Song</b> Tsinghua University
15:00-15:30	Antiferromagnetic memory using linear magnetoelectricity in honeycomb $\text{Co}_4\text{Nb}_2\text{O}_9$	<b>Chengliang Lu</b> Huazhong University of Science and Technology
<b>Session C3</b>	Materials by design <span style="float: right;">Room C</span>	Chair: <b>Yurong Yang</b> Nanjing University
14:00-14:30	An intrinsic ferromagnetic polar metal by design	<b>Pu Yu</b> Tsinghua University
14:30-15:00	Design of giant polarization in ferroelectric and multiferroic thin films via tensile strain	<b>Jun Chen</b> University of Science and Technology Beijing
15:00-15:30	Continuous structural phase transition and its implications on the physical properties of complex oxides	<b>Hanghui Chen</b> New York University Shanghai
Coffee break		
<b>Session D1</b>	Theoretical approaches <span style="float: right;">Room A</span>	Chair: <b>Chungang Duan</b> East China Normal University
15:45-16:15	Second-principles modelling of ferroelectric and multiferroic perovskite oxides	<b>Philippe Ghosez</b> Université de Liège

16:15-16:35	Convert widespread paraelectric perovskite to BiFeO <sub>3</sub> -type ferroelectrics	Hongwei Wang Ningbo University
<b>Session D2</b>	Multiferroic mechanisms Room B	Chair: <b>Hongjian Zhao</b> Jilin University
15:45-16:15	Topological switching in multiferroic GdMn <sub>2</sub> O <sub>5</sub>	<b>Sergey Artyukhin</b> Istituto Italiano di Tecnologia
16:15-16:35	Emergent multiferroism with magnetodielectric coupling in EuTiO <sub>3</sub> created by a negative pressure control of strong spin-phonon coupling	Weiwei Li Nanjing University of Aeronautics and Astronautics
<b>Session D3</b>	Molecules Room C	Chair: <b>Chengliang Lu</b> Huazhong University of Science and Technology
15:45-16:15	Multiferroicity and magnetoelectric effects in single-molecule magnets	<b>Young Sun</b> Chongqing University
16:15-16:35	The subtle interplay between the organic molecules and the inorganic framework through hydrogen bonding in hybrid halide perovskites	Jinzu Zhao South China Normal University
<b>Session E</b>	Posters	
	All posters are available at <a href="https://physics.seu.edu.cn/apctp2022/posters">https://physics.seu.edu.cn/apctp2022/posters</a>	

## Oct. 12th

<b>Session F</b>	<b>Keynote</b> Room A	Chair: <b>Cewen Nan</b> Tsinghua University
8:30-9:15	<b>Multiferroic - SOT metal interface physics</b>	<b>Ramamoorthy Ramesh</b> University of California Berkeley/Rice University
<b>Session G1</b>	Junctions Room A	Chair: <b>Yonggang Zhao</b> Tsinghua University
9:15-9:45	Prediction of a giant tunneling magnetoresistance effect in antiferromagnetic tunnel junctions	<b>Evgeny Tsymbal</b> University of Nebraska Lincoln
9:45-10:15	Prototype memory and synaptic devices based on ferroelectric tunnel junctions	<b>Yuewei Yin</b> University of Science and Technology of China
<b>Session G2</b>	Devices Room B	Chair: <b>Cheng Song</b> Tsinghua University
9:15-9:45	Magnetoelectric materials and M/NEMS: a path toward novel electronics	<b>Nian X Sun</b> Northeastern University
9:45-10:15	Flexible and high-temperature magnetoelectric sensors	<b>Guoliang Yuan</b> Nanjing University of Science and Technology
<b>Session G3</b>	Piezoelectricity Room C	Chair: <b>Ming Liu</b> Xi'an Jiaotong University

9:15-9:45	Transparent ferroelectric crystals with ultrahigh piezoelectricity	<b>Fei Li</b> Xi'an Jiaotong University
9:45-10:15	Structure and properties in lead-free piezoelectric ceramics	<b>Jiagang Wu</b> Sichuan University
Coffee break		
<b>Session H1</b>	Topologies <span style="float: right;">Room A</span>	Chair: <b>Jan Seidel</b> University of New South Wales
10:30-11:00	Toroidal polar topology in polymer ferroelectrics	<b>Yang Shen</b> Tsinghua University
11:00-11:30	Physical realization of topological Roman surface by spin-induced ferroelectric polarization in cubic lattice	<b>Yisheng Chai</b> Chongqing University
11:30-12:00	Manipulation of ferroelectric topological defects by nano-scratch	<b>Xueyun Wang</b> Beijing Institute of Technology
11:40-12:00		
<b>Session H2</b>	Theoretical designs <span style="float: right;">Room B</span>	Chair: <b>Shi Liu</b> Westlake University
10:30-11:00	Ferrovalley, half-valley and supervalley materials	<b>Chungang Duan</b> East China Normal University
11:00-11:30	Property analysis and simulation package for materials (PASP) and its applications to multiferroics	<b>Hongjun Xiang</b> Fudan University
11:30-12:00	Machine-learning interatomic potential for molecular dynamics simulation of lead-free ferroelectric alkaline niobate	<b>Ke Wang</b> Tsinghua University
<b>Session H3</b>	Flexoelectricity <span style="float: right;">Room C</span>	Chair: <b>Junling Wang</b> Southern University of Science and Technology
10:30-11:00	Flexoelectricity under the tip: from field concentration to moire superlattice	<b>Jiangyu Li</b> Southern University of Science and Technology
11:00-11:30	Flexoelectricity stabilized rhombohedral distortion in LaHfO <sub>2</sub> ferroelectric thin films	<b>Di Wu</b> Nanjing University
11:30-12:00	Novel flexoelectricity in nanomaterials	<b>Jiawang Hong</b> Beijing Institute of Technology
Lunch break		
<b>Session II</b>	Characterizations <span style="float: right;">Room A</span>	Chair: <b>Chan-Ho Yang</b> Korea Advanced Institute of Science and Technology
14:00-14:30	Circular dichroism of resonant x-ray diffraction from magnetoelectrics	<b>Tsuyoshi Kimura</b> University of Tokyo
14:30-15:00	Ultrafast dynamics studies of ferroelectric thin films	<b>Qian Li</b> Tsinghua University
15:00-15:30	Nonlinear optical responses in two-dimensional multiferroics	<b>Hua Wang</b> Zhejiang University



<b>Session I2</b>	Unconventional ME effects Room B	Chair: <b>Ding-Fu Shao</b> Institute of Solid State Physics, HFIPS, Chinese Academy of Sciences
14:00-14:30	Rashba effect and novel indirect magnetoelectric coupling	<b>Yurong Yang</b> Nanjing University
14:30-15:00	Anisotropic linear and nonlinear charge-spin conversion in topological semimetal SrIrO <sub>3</sub>	<b>Zhiming Wang</b> Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences
15:00-15:30	Large nonreciprocal directional dichroism in a collinear anti- ferromagnet	<b>Kenta Kimura</b> University of Tokyo
<b>Session I3</b>	Energy harvest Room C	Chair: <b>Guoliang Yuan</b> Nanjing University of Science and Technology
14:00-14:30	Bulk photovoltaic effect in two dimensional ferroic materials	<b>Jian Zhou</b> Xi'an Jiaotong University
14:30-15:00	Electric field induced crystallization produces giant elec- trocaloric effect	<b>Houbing Huang</b> Beijing Institute of Technol- ogy
15:00-15:30	In-sensor computing based on ferroelectric photovoltaics	<b>Zhen Fan</b> South China Normal Univer- sity
Coffee break		
<b>Session J</b>	<b>Keynote</b> Room A	Chair: <b>Tsuyoshi Kimura</b> University of Tokyo
15:45-16:30	<b>Hidden magnetoelectric multipoles in multiferroics and beyond</b>	<b>Nicola Spaldin</b> Swiss Federal Institute of Technology in Zurich
<b>Session K1</b>	Chirality Room A	Chair: <b>Changsong Xu</b> Fudan University
16:30-17:00	Microscopic investigation of chiral crystals and their cross- correlated responses	<b>Hiroaki Kusunose</b> Meiji University
17:00-17:30	Noncollinear magnetism in perovskite antiferromagnets	<b>Hongjian Zhao</b> Jilin University
17:30-17:50	Direct evidence for an intermediate multiferroic phase in LiCuFe <sub>2</sub> (VO <sub>4</sub> ) <sub>3</sub>	Meifeng Liu Hubei Normal University
<b>Session K2</b>	Anomalous Hall & electric field Room B	Chair: <b>Er-Jia Guo</b> Institute of Physics, Chinese Academy of Science
16:30-17:00	Ru doping induced spin frustration and enhancement of the room-temperature anomalous Hall effect in La <sub>2/3</sub> Sr <sub>1/3</sub> MnO <sub>3</sub> films	<b>Lingfei Wang</b> University of Science and Technology of China
17:00-17:30	Spin-neutral tunneling anomalous Hall effect	<b>Ding-Fu Shao</b> Institute of Solid State Physics, HFIPS, Chinese Academy of Sciences

17:30-17:50	Study on the evolution of electric field and breakdown strength morphology of dielectric composites	Hailong Hu Central South University
<b>Session K3</b>	Publisher & manufacturers Room C	Chair: <b>Linglong Li</b> Southeast University
16:30-16:50	Publishing with Nature journals	Jiajun Zhu Springer-Nature
16:50-17:05	Arrayed Materials PVD systems introduction	Chong Zhang Arrayed Materials
17:05-17:20	NANOSCOPE SYSTEMS laser scanning confocal microscopy and Raman spectroscopy	Byung-Seon Chun Nanoscope Systems Sunano Group
17:20-17:35	Applications of OptiCool magneto-optical cryostat	Shucui Sun Quantum Design
17:35-17:50	Getting to zero – quantitative electromechanical atomic force microscopy	Ren Zhu Oxford Instruments

## Oct. 13th

<b>Session L1</b>	2D multiferroics Room A	Chair: <b>Je-Geun Park</b> Seoul National University
8:30-9:00	A type-II multiferroic in two dimensions	<b>Riccardo Comin</b> Massachusetts Institute of Technology
9:00-9:30	Realistic spin model for multiferroic NiI <sub>2</sub>	<b>Changsong Xu</b> Fudan University
9:30-10:00	Coupling incompatible order parameters in two-dimensional ferroelectrics	<b>Shi Liu</b> Westlake University
Coffee break		
<b>Session L2</b>	Dynamics & Topology Room B	Chair: <b>Lingfei Wang</b> University of Science and Technology of China
8:30-9:00	Dynamics and new aspects in multiferroics orders	<b>Alexander Balatsky</b> University of Connecticut/Nordic Institute for Theoretical Physics
9:00-9:30	Topological spin/structure couplings in heterochiral intercalated transition metal chalcogenides	<b>Kai Du</b> Rutgers University
9:30-10:00	Functional topological defects in ferroelectric and multiferroic materials	<b>Jan Seidel</b> University of New South Wales
<b>Session L3</b>	Magnetoelectric films Room C	Chair: <b>Hao Yang</b> Nanjing University of Aeronautics and Astronautics
8:30-9:00	Site-specific spectroscopic measurement of spin and charge in (LuFeO <sub>3</sub> ) <sub>m</sub> /(LuFe <sub>2</sub> O <sub>4</sub> ) <sub>1</sub> multiferroic superlattices	<b>Jan Musfeldt</b> University of Tennessee Knoxville

9:00-9:30	Nonvolatile electric-field control of inversion symmetry	<b>Lucas Caretta</b> Brown University
9:30-10:00	Imaging of real-space topological textures and their order parameters	<b>Yu-Tsun Shao</b> Cornell University/University of Southern California
Coffee break		
<b>Session M1</b>	Sliding & twisting <span style="float: right;">Room A</span>	Chair: <b>Hongjun Xiang</b> Fudan University
10:15-10:45	Sliding ferroelectricity in 2D materials: related physics and extensions	<b>Menghao Wu</b> Huazhong University of Science and Technology
10:45-11:15	Tunable vertical ferroelectrics and multiferroics by interlayer sliding in 2D materials	<b>Wei Ren</b> Shanghai University
11:15-11:45	Ultra-flat bands in twisted bilayer ferroelectric $\alpha$ -In <sub>2</sub> Se <sub>3</sub>	<b>Yunhao Lu</b> Zhejiang University
<b>Session M2</b>	Artificial structures <span style="float: right;">Room B</span>	Chair: <b>Yuefeng Nie</b> Nanjing University
10:15-10:45	Magnetoelectric phase transition driven by interfacial-engineered Dzyaloshinskii-Moriya interaction	<b>Jinxing Zhang</b> Beijing Normal University
10:45-11:15	Vertically aligned nanocomposite oxide thin films: from design to application	<b>Hao Yang</b> Nanjing University of Aeronautics and Astronautics
11:15-11:45	Design of multiferroic and magnetoelectric coupling based on 2D perovskites	<b>Junting Zhang</b> China University of Mining and Technology
11:45-12:05	Probing anisotropic transport in atomically thin rhenium disulfide via ferroelectric domain-controlled nanowire patterning	Dawei Li Dalian University of Technology
<b>Session M3</b>	Low-dimensional systems <span style="float: right;">Room C</span>	Chair: <b>Hanghai Chen</b> New York University Shanghai
10:15-10:45	Hybrid improper hyperferroelectricity in quasi-2D materials	<b>Xuezheng Lu</b> Southeast University
10:45-11:15	Electrical control of magnetic coupling in vdW 2D systems	<b>Chengxi Huang</b> Nanjing University of Science and Technology
11:15-11:35	Magnetoelectric properties in low-dimensional heterostructures	Han Wang Institute of Metal Research, Chinese Academy of Sciences
11:35-11:55	Giant pyroelectric energy conversion from heat to electricity by highly reversible phase-transforming ferroelectrics	Chenbo Zhang Tongji University
Lunch break		
<b>Session N1</b>	Student forum 1 <span style="float: right;">Room A</span>	Chair: <b>Houbing Huang</b> Beijing Institute of Technology

14:00-14:20	Monolayer puckered pentagonal VTe <sub>2</sub> : An emergent two-dimensional ferromagnetic semiconductor with multiferroic coupling	Xuanyi Li Fudan university
14:20-14:40	Ultralow mechanical force driving domain switching in suspended 2D ferroelectrics through transverse flexoelectricity	Yingzhuo Lun Beijing Institute of Technology
<b>Session N2</b>	Student forum 2 <span style="float: right;">Room B</span>	Chair: <b>Xueyun Wang</b> Beijing Institute of Technology
14:00-14:20	Nd <sup>3+</sup> induced twofold continuous spin reorientation transition and magnetization of b-axis in Dy <sub>0.9</sub> Nd <sub>0.1</sub> FeO <sub>3</sub> single crystal	Jiamin Shang Shanghai Institute of Ceramics, Chinese Academy of Sciences
14:20-14:40	A systematic study of Young's modulus of hexagonal magnetites	Ziyan Gao Beijing Institute of Technology
<b>Session N3</b>	Student forum 3 <span style="float: right;">Room C</span>	Chair: <b>Xuezeng Lu</b> Southeast University
14:00-14:20	Imaging of antiferromagnetic domains using nonreciprocal rotation of reflected light	Keito Arakawa University of Tokyo
14:20-14:40	First-principles study of the lattice thermal conductivity of the ferroelectric nitride perovskite	Qi Ren Beijing Institute of Technology
<b>Session O</b>	Closing <span style="float: right;">Room A</span>	
14:40-14:50	Brief summary & announcement of best posters	Shuai Dong Southeast University
14:50-15:00	Introduction of next year workshop	Tsuyoshi Kimura University of Tokyo

## Posters

Name	Affiliation	Title
Xuli Cheng	Shanghai University	Intrinsic ferromagnetism with high Curie temperature and strong anisotropy in a ferroelastic VX monolayer (X = P, As)
Fengjun Zhou	King Abdullah University of Science and Technology	Topological Magnons and Magnon Thermal Hall Effect in Kagome Ferromagnets
Zhiwen Wang	Fudan university	Strain-enabled control of chiral magnetic structures in MnSeTe monolayer
Huayu Yang	Beijing Institute of Technology	Polarization-switching pathway determined electrical transport behaviors in rhombohedral BiFeO <sub>3</sub> thin films
Yuanyuan Fan	Beijing Institute of Technology	Photo-enhanced electroresistance at dislocation-mediated phase boundary
Bin Lao	Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences	Room temperature spin-orbit torque efficiency and magnetization switching in SrRuO <sub>3</sub> -based heterostructures
Ziyan Gao	Beijing Institute of Technology	Manipulation of Topological Ferroelectric Domain by Nanoindentation and Nanoscratch
Zengxing Lu	Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences	Cooperative control of perpendicular magnetic anisotropy via crystal structure and orientation in freestanding SrRuO <sub>3</sub> membranes
Yang Li	Tsinghua University	TBD
Dezhao Wu	Tsinghua University	Controlling nonlinear magneto-optical effects in two-dimensional magnets
Yaorong Luo	Nanjing University	Diversity of structural phases in AGeX <sub>3</sub> halides
Yugang Zhang	Chongqing university	Observation of enhanced spin-spin correlations at triple point in 2D ferromagnetic Cr <sub>2</sub> X <sub>2</sub> Te <sub>6</sub> (X=Si, Ge)
Jiawei Huang	Westlake University	Prediction of intrinsic one-dimensional ferroelectric nanothreads
Jing Wu	Westlake University	Deep Learning of Accurate Force Field of Ferroelectrics
Liyang Ma	Westlake University	Structural Polymorphism Kinetics Promoted by Charged Oxygen Vacancy in HfO <sub>2</sub>
Zhiwei Liu	East China Normal University NYU-ECNU Institute of Physics, NYU Shanghai	First-principles study of soft ferromagnetism in ultrathin freestanding LaMnO <sub>3</sub> films
Yaxuan Wu	Henan University	Ni(NCS) <sub>2</sub> monolayer: a robust bipolar magnetic semiconductor
Yihang Bai	Henan University	Cr <sub>2</sub> XTe <sub>4</sub> (X = Si, Ge) monolayers: a new type of two-dimensional high-TC Ising ferromagnetic semiconductors with a large magnetic anisotropy



Pengfei Guan	China University of Mining and Technology	Combined Ferroelastic and Optical Control of Electronic Transport in Mott-Oxide–Ferroelectric Heterostructures
Ningbo Fan	Soochow University	Origin of negative electrocaloric effect in Pnma-type antiferroelectric perovskites
Zhongwen Li	Huaiyin Institute of Technology	Unusual topological domain structure in high-density array of ferroelectric nanodots
Ning Ding	Southeast University	Direct observation of geometric and sliding ferroelectricity in an amphidynamic crystal
Ziwen Wang	Southeast University	Ferroelectricity in strained Hf <sub>2</sub> CF <sub>2</sub> monolayer
Ying Zhou	Southeast University	Hybrid improper ferroelectricity and magneto-electric coupling in a two-dimensional perovskite oxide
Wencong Sun	Southeast University	Stacking dependent ferroelectricity and antiferroelectricity in quasi-one-dimensional oxyhalides NbOX <sub>3</sub>

# Introduction of APCTP

The Asia Pacific Center for Theoretical Physics (APCTP), the Korea's first and only international research institute, was established in June 1996, with Professor Chen-Ning Yang (Nobel Laureate for physics in 1957) as its founding president. As an international non-governmental organization, currently it includes 17 members countries & regions in the Asia-Pacific region.

**Aim:** As an international organization in the field of theoretical physics, APCTP aims the leading basic science in the Asia Pacific region.

**Roles:** To create a basic research hub and to enhance global leadership capability. To provide an academic platform for theoretical physics community in the Asia Pacific region.

## [Research Programs]

### **Junior Research Group (JRG)**

The Center collectively supports and funds outstanding mid-career physicists' inspirational ideas and their research projects. Each group leader can organize a research group and run it independently. All JRGs have successfully achieved their best research results with noticeable contributions to physics community and beyond.

### **Young Scientist Training Program (YST)**

With the stimulating and active scientific environment, a variety of scientific activities and in-house researchers, the Center gives an opportunity to young promising physicists (scientists) from the Asia Pacific region to increase their research capability. (endorsed by APEC's PPSTI)

### **Senior Advisory Group (SAG)**

Groups of established senior researchers provide active support for the young scientists of the Center through collaborative research activities such as mentoring, consulting, advisory sessions and lectures for innovative research outcomes.

## [Scientific Activities]

### **Academic Programs**

The Center provides an academic platform to discuss frontier research topics and promotes international collaborations. In-depth studies and intensive discussions on particular topics of physics are also actively performed on this platform by small groups of domestic and international physicists. Every year, more than 4,000 researchers participate in the conferences, workshops, schools, or long-term academic programs at the Center.

### **Publication of the AAPPS Bulletin**

In order to develop the AAPPS Bulletin as a representative journal of the Asia Pacific region, the Center which is a headquarters of the Association of Asia Pacific Physical Societies (AAPPS) publishes influential articles in cooperation with the AAPPS and a global publishing network.

### **Strategic Agenda Development in Science Diplomacy**

Under the goal of strengthening the global science, technology and innovation (STI) network and scientific cooperation with nongovernmental organizations, the Center collaborates with international organizations including APEC, etc. and jointly develops global STI agendas and solutions.

## [Physics Outreach Program]

The Center carries out diverse science-communication activities to communicate with the general public and strengthen scientific ties among scientists in the region. The monthly web journal (<http://crossroads.apctp.org>) is published and distributed on-line.

## [International Cooperation]

In cooperation with member countries and institutes, the APCTP has led research excellence in the field of theoretical physics and would like to share the excitement and wonder of science with the general public.

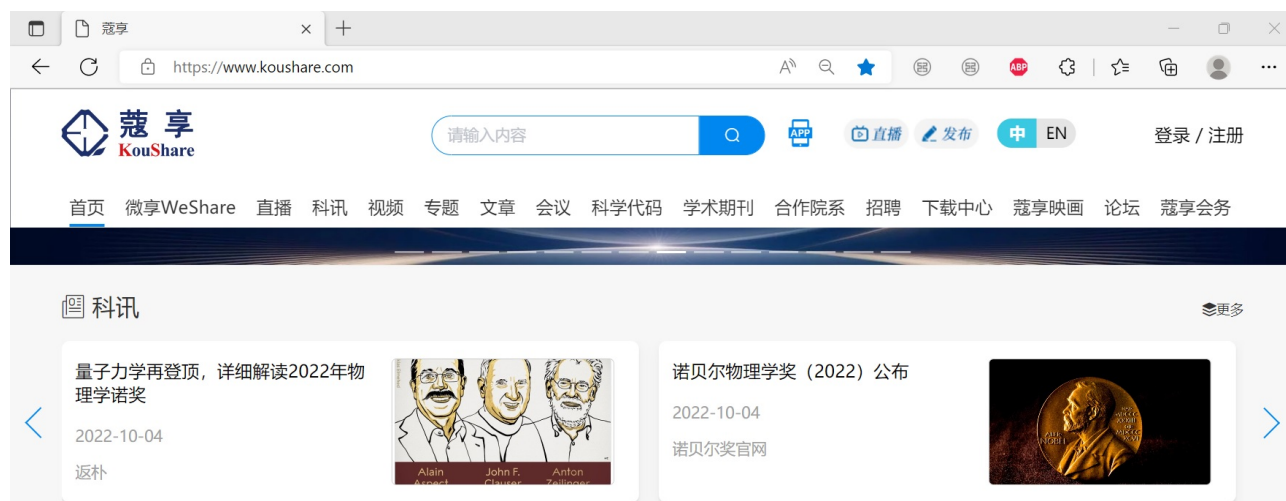
<https://apctp.org/theme/d/html/network/01.php>

*The APCTP is supported by the Korean Government through the Science and Technology Promotion Fund and Lottery Fund and strives to maximize social value through its various activities.*

# Introduction of KouShare

The research & development team of KouShare is mainly responsible for the development and operation of the KouShare platform ([www.Koushare.com](http://www.Koushare.com); WeChat public account: KouShare Academic), aiming to establish a global scientific research and development of high-performance computing service platform, scientific program sharing platform, scientific knowledge dissemination platform, youth science education platform and website development etc.

At present, KouShare has signed strategic cooperation agreements with many domestic and foreign academic conferences and many scientific research institutes, which greatly facilitates the work of professional researchers and promotes dissemination of cutting-edge scientific knowledge popular science education for young people.



KouShare is also a scientific research network platform focusing on academic video dissemination at home and abroad, presenting the latest scientific research developments to the majority of scientific researchers.

Adhering to the concept of disseminating science, sharing science, and serving science, KouShare records academic reports for scientists for free, and broadcasts them on the KouShare platform for the majority of scientific researchers to watch and learn, disseminate scientific knowledge and expand scientists at the same time academic influence. The company promises that the copyright of the video belongs to the conference organizer or the speaker, and the video content is only used for scientific communication and will not be used for other commercial purposes.

# Introduction of SEU

Southeast University (SEU), located in Nanjing, is a prestigious institution of higher learning renowned both at home and abroad. As one of the national key universities directly subordinate to the Ministry of Education of China, it is one of the universities involved in National “985 Project” & “211 Project”. In 2017, SEU was ranked on the list of constructing “Class A first-rate world universities”.

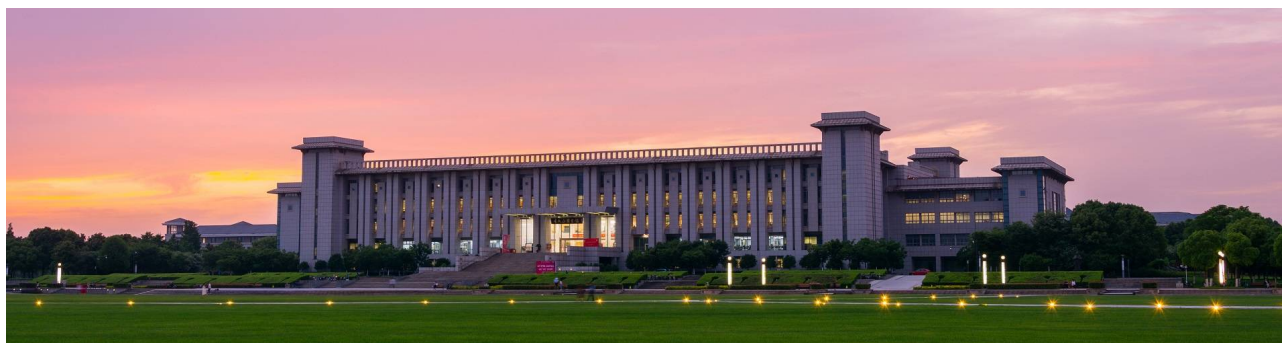
Its origin can be traced back to 1902 when it was founded as Sanjiang Normal College, then known as Liangjiang Normal College, Nanjing Higher Normal School, National Southeast University and National Central University, National Nanjing University, and Nanjing Institute of Technology. In 1988, the university was renamed to Southeast University. The university motto of SEU is “Striving for Perfection”. Right now, SEU has three campuses in Nanjing, as well as Wuxi branch and Suzhou campus.

Currently, SEU has 83 bachelor’s degree programs, 34 first-level disciplines PhD degree programs and 48 first-level disciplines Master degree programs. Among the full-time ~ 36,000 students, there are ~ 16,000 undergraduate students and ~ 20,000 graduate students, including ~ 2,000 overseas students. SEU features high-level faculty comprising ~ 3,000 full-time teachers, including 16 academicians of Chinese Academy of Sciences and Chinese Academy of Engineering, 3 academician of the Academy of Europe.

SEU is a comprehensive research-oriented university featuring engineering discipline while covering many other disciplines including philosophy, economics, law, education, literature, science, engineering, medicine, management and art, etc.. Among others, 12 disciplines have been listed as national “double first-class” construction disciplines and 5 disciplines obtain A+ in the fourth round of disciplinary assessment; 13 disciplines are ranked among top 1% of ESI internationally, in which, the engineering discipline is listed at No. 17 and computer science at No. 9. The university owns 3 state key laboratories, 4 state engineering research centers, 2 state engineering technology research centers, 1 state professional laboratory. In 2021, SEU has received the research funding of RMB ~ 3 billion. SEU has participated in and contributed to several major projects, such as Mission Moon, Three Gorges Project, 500-meter Radio Telescope, Beijing Sub-center, Hongkong-Zhuhai-Macao Bridge, High-speed Rail Technology, Antarctic Scientific Investigation, South China Sea Island, and Wireless Charging, etc..

SEU is actively involved in international cooperations, by maintaining cooperation and exchange programs with multiple world-class universities and research institutions such as Massachusetts Institute of Technology, University of California at Berkeley, University of Maryland, University of British Columbia, University of Cambridge, Imperial College London, University of Manchester, University of Leeds, ETHZ, KTH Royal Institute of Technology, Technical University of Munich, Catholic University of Leuven, Trinity College Dublin, Australia Monash University and Tokyo Institute of Technology, etc. In 2017, SEU initiated the establishment of the “Sino-British University Engineering Education and Research Consortium”, which is the first university consortium of its kind between China and UK with engineering education and research as the highlight.

After its 120 years anniversary, SEU is persisting the mission to contribute to the great rejuvenation of China and the advancement of human civilization.



## Introduction of School of Physics, SEU

Our school of physics originated from the “Gezhi” department of Sanjiang Normal School established in 1904. In 1952, because of the reorganization of college/university system in China, Nanjing Institute of Technology (the predecessor of Southeast University) established the physics teaching and research group. In 1983, the department of physics & chemistry was re-established, and later the department of physics was founded in 1989. In 2017, the department of physics was expanded to school of physics.

During the past century, numerous distinguished scholars have either studied or worked in our school of physics and its predecessors, including Prof. Chien-Shiung Wu, Prof. You-Hsun Wu, Prof. Chung-Yao Chao, and Prof. Jici Yan. Our school of physics now has both Master of Science, Doctor of Philosophy programs in the first-level subject of physics, Bachelor of Science degree in Physics and Applied Physics.

The School of Physics has more than 100 faculty members, including more than 40 professors. There are 1 RSC Fellow, 3 recipients of the National Science Fund for Distinguished Young Scholars, 3 recipients of the National Science Fund for Outstanding Youth Young Scholars, 6 recipients of the National Young Talents Project, and many other excellent academics.

Our physics discipline was selected into the key disciplines of Jiangsu Province. The main scientific research directions include nuclear physics and particle physics, condensed matter theory, spintronics, nanomaterials and optoelectronic devices, superconductivity, quantum optics, new energy materials, laser and nonlinear optics. We publishes more than 100 papers every year in SCI-indexed journals, some of which were published Nature, Nature Physics, Nature Materials, and PRL. Our physics discipline has entered the top 1% of the international ranking of ESI.



Prof. Chien-Shiung Wu (1912-1997), a world-famous physicist and alumna of National Central University (the predecessor of SEU and Nanjing University). She is best known for conducting the Wu experiment, which contradicted the hypothetical law of conservation of parity. This discovery resulted in her colleagues Tsung-Dao Lee and Chen-Ning Yang winning the 1957 Nobel Prize in physics, and earned Wu the inaugural Wolf Prize in Physics in 1978. She was an elected member of the U.S. National Academy of Sciences (1958), and one of the first foreign academicians of the Chinese Academy of Sciences (1994). She was the first female president of the American Physical Society (1975).



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