

物理系

Department of Physics

本系简介 About Us

物理系是 2011 年南方科技大学首批设立的五个院系之一。现有物理学和应用物理学两个本科专业，物理学一级学科硕士点，物理学一级学科博士点和博士后流动站；已建成完整的从本科、硕士、博士到博士后的人才培养体系。物理系毕业生理论基础扎实、科研能力突出，超过七成的学生升学深造，广泛活跃在北大、牛津等国内外高等院校和科研机构。

物理系吸引了国内外的大批青年才干，现有 43 名专职教师，其中讲席教授 7 人，教授 5 人、副教授 23 人、助理教授 6 人、教学教授 2 人，大部分毕业或曾就职于世界 Top100 大学或研究所。高端人才有中科院院士 3 位、教育部特聘教授 4 位、国家杰青 4 位、国家特支计划专家 2 位、南粤优秀教师 2 位、深圳市杰出人才 2 位、“鹏城学者” 5 位。一流的人才给物理系带来了卓越的成果。

截至 2022 年 6 月，我系已独立承担 264 余项国际级、地方级的科研项目，包括国家自然科学基金项目 99 项，科技部、教育部项目 22 项，广东省自然科学基金项目、重点领域研发计划及联合基金等 43 项，深圳市项目 94 项，科研经费累计逾 6 亿。我系教师在 Nature、Science、Physical Review X、Physical Review Letters 等学术刊物上累计发表论文逾 1800 篇，其中以南科大为第一或通讯作者单位的文章 1022 篇，影响因子 > 10 或者 PRL 等顶级期刊有 281 篇。体现了我系科研人员深厚的学养和突出的科研能力。

$$\omega = 2\pi f \quad \beta =$$

$$\frac{\sin \alpha}{\sin \beta} = \frac{v_1}{v_2} = \frac{\omega_1}{\omega_2} \quad v =$$

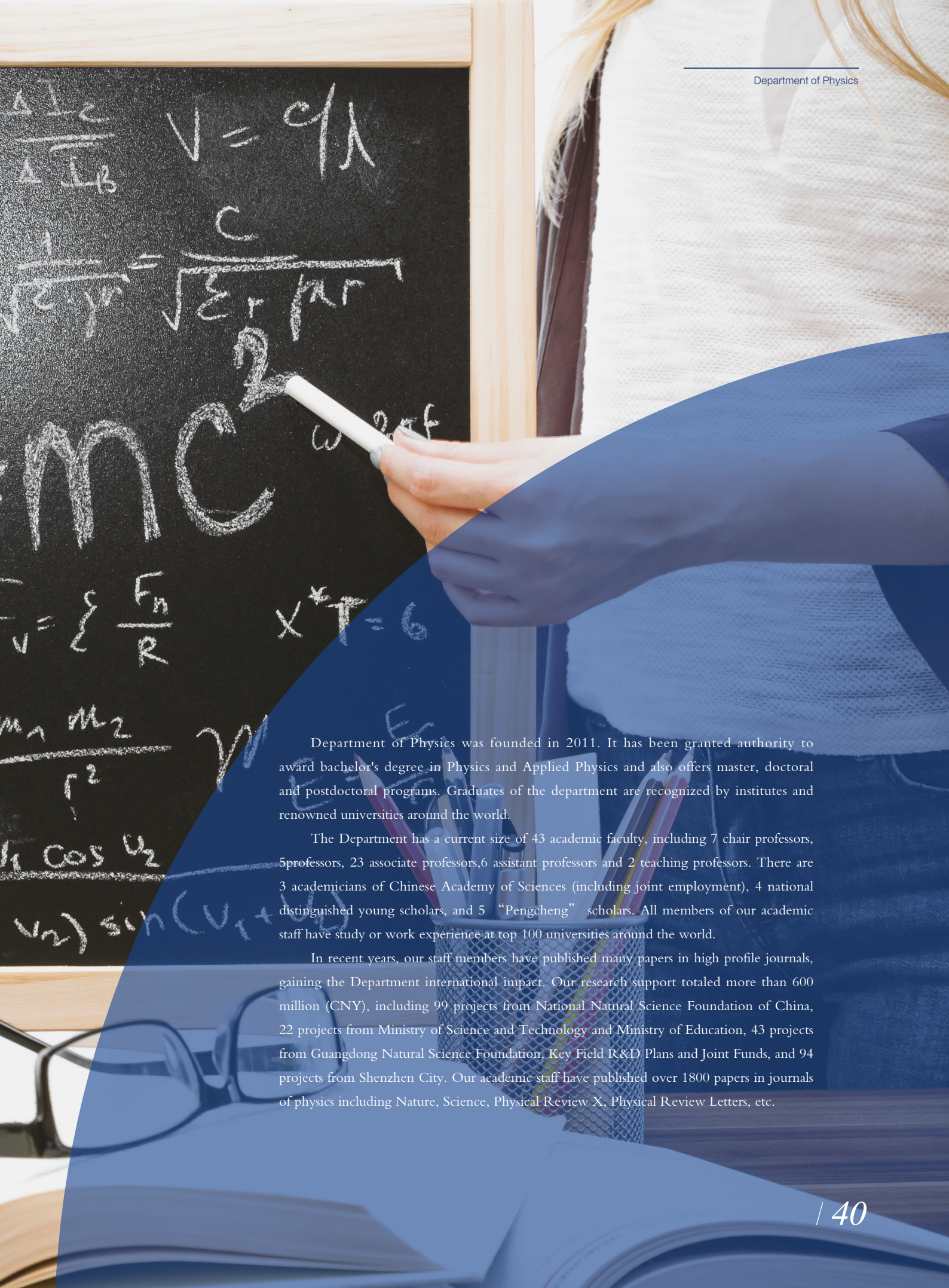
$$R = \rho \frac{l}{S}$$

$$T = \frac{h\nu}{T}$$

$$W = \vec{F} \cdot d \cos \alpha$$

$$F_n = \sin \theta \cdot mg \quad F_g =$$

$$\left(\frac{E_x}{E_0} \right) = \frac{1}{\cos(\theta)}$$



Department of Physics was founded in 2011. It has been granted authority to award bachelor's degree in Physics and Applied Physics and also offers master, doctoral and postdoctoral programs. Graduates of the department are recognized by institutes and renowned universities around the world.

The Department has a current size of 43 academic faculty, including 7 chair professors, 5 professors, 23 associate professors, 6 assistant professors and 2 teaching professors. There are 3 academicians of Chinese Academy of Sciences (including joint employment), 4 national distinguished young scholars, and 5 “Pengcheng” scholars. All members of our academic staff have study or work experience at top 100 universities around the world.

In recent years, our staff members have published many papers in high profile journals, gaining the Department international impact. Our research support totaled more than 600 million (CNY), including 99 projects from National Natural Science Foundation of China, 22 projects from Ministry of Science and Technology and Ministry of Education, 43 projects from Guangdong Natural Science Foundation, Key Field R&D Plans and Joint Funds, and 94 projects from Shenzhen City. Our academic staff have published over 1800 papers in journals of physics including Nature, Science, Physical Review X, Physical Review Letters, etc.

我系研究领域涵盖物理科学及系列前沿研究方向，设有凝聚态物理、理论物理、计算物理和光学四个二级学科，同时正在布局天体物理、粒子物理、生物物理等方向的学科建设。同时，物理系在多个公认大学及学科排名上，取得了亮眼的成绩：泰晤士 2022 学科评级中，南科大物理学评级为 A；软科 2021 中国最好学科排名中，物理学位列第 12 位；在 2021 Nature Index 排名中，Physical Science 在 Nature Index 官网排名上升至全国高校第 12 名（包括香港高校）；同时，南科大物理学科也于今年首次进入了 ESI 全球前 1%。

Department of Physics now offers 4 majors in condensed matter physics, computational physics, theoretical physics and optics, while setting up astrophysics, particle physics and biological physics. Our Physics discipline is rated as "A" in the subject rating of the THE 2022, it also ranked 12th in 2021 Shanghai Ranking's Chinese University Ranking of the Best Subject and 12th in China at the ranking of 2021 Nature Index. At the same time, The Physics discipline of SUSTech entered the top 1% of ESI in the world for the first time.

凝聚态物理 Condensed Matter Physics

在极低温及强磁场等条件下，对各种新兴低维系的物理性质，特别是电子或自旋的量子输运性质、拓扑绝缘体等新型量子效应的研究及相关的量子调控新原理、新方案、进行深入而全面的研究。探索新型功能材料，发展和完善各种功能材料的制备方法，研究材料的光学、热学、电学、磁学、声学以及力学等性能。

Research Contents:

Physical properties of various emerging thin film materials will be investigated systematically under ultra-low temperature and high magnetic field conditions, especially the quantum transport of electrons or spins in these materials. We will also aim to effectively control the novel quantum phenomena revealed in these materials by optical, electrical, or magnetic means. Search for novel functional materials, develop and improve the synthesis techniques of various functional materials, study their corresponding photonic, thermal, electronic, magnetic, phonic and mechanic properties.

原子分子光物理 Atomic, Molecular and Optical (AMO) Physics

冷原子物理及原子光学与原子玻色-爱因斯坦凝聚：纳米结构和纳米光学；全固化激光器物理及应用；近场光学；光谱学。

Research Contents:

Cold atom/molecule physics; Atomic optics and atomic Bose-Einstein condensation; Laser cooling and trapping of atom/molecules; Nano structure and nano optics; Optical spectroscopy.

研究内容软凝聚态物理、软物质力学。

Research Contents:

Soft condensed matter physics; Soft material mechanics.

生物物理
Biophysics

计算物理是物理学的重要分支之一，与理论物理和实验物理相互补充。研究领域涵盖不同维度下的半导体、金属、绝缘体等多种材料，并设计和预测多种新材料。

Research Contents:

Computational physics is an important branch of physics, which has a multitude relationship with theoretical physics and experimental physics. Our research area is mainly to study the fundamental properties of different dimensional materials using combined theoretical calculations and experiments. Furthermore, we also design and predict the new materials.

计算物理
Computational Physics

主要是对强关联电子系统包括高温超导理论、分数量子霍尔效应、磁性理论及数值的研究。

Research Contents:

Theoretical study mainly focus on the strongly correlated electron systems, including high- T_c superconductivity, fractional quantum hall effect, and magnetic theory and its numerical investigations.

理论物理
Theoretical Physics

量子计算机的结构与实现、量子信息的原理和应用、量子通信网络的设计和实现等。

Research Contents:

Quantum Information and Quantum Computation mainly focus on the structure and implementation of a quantum computer, the principle and application of quantum information, the design and implementation quantum communication network, etc.

量子信息与量子计算
Quantum Science and Engineering

研究比原子核更深层次的微观世界中物质的结构性质，和在很高的能量下，这些物质相互转化的现象，以及产生这些现象的原因和规律。研究天空物体的性质及它们的相互作用。

Research Contents:

High-energy Physics mainly focus on the structural properties of substances in the micro world smaller than nuclei, and the phenomena of mutual transformation between these substances under extremely high energy, as well as the causes and laws of these phenomena. Study the properties of astronomical object and their interactions.

高能与天体物理
High-energy Physics and Astrophysics

Research Space



科研空间 Research Space

物理系实验室硬件条件完善，拥有包括表面反应及分析仪、球差校正透射电子显微镜、电子束曝光机、超导核磁共振谱仪、综合物性测量系统、分子束外延机、聚焦离子束仪、自旋成像的角分辨光电子能谱仪、高性能计算系统和无液氦超导磁体变温测量仪等在内的总价值近5亿元人民币的仪器设备，为学术研究提供了强有力的支持。

The Department of Physics has well-equipped laboratories, boasting surface reaction analyzer, spherical aberration correction transmission electron microscope (TEM), electron beam exposure (EBE) machine, superconducting nuclear magnetic resonance spectrometer, physical property measurement system (PPMS), molecular beam epitaxy (MBE) machine, focused ion beam (FIB) instrument, spin imaging angle-resolved photoemission spectroscopy (ARPES), highperformance computing systems, and non-liquid helium variable temperature measurements with superconducting magnet, with a total value of about RMB 500 million, providing a strong support for academic research.

物理系已建成包括皮米尺度上的基础和应用研究中心、量子科学与工程研究院、中子科学中心、纳米结构与纳米能源实验室、量子输运实验室、薄膜物理实验室等在内的30余个科研平台/专业实验室，总面积超过5000平方米。

The Department has set up more than 30 scientific research platforms and specialized laboratories, including the Picometer-scale Fundamental & Applied Research Center, the Institute of Quantum Science and Engineering, the Neutron Science Center, the Nanostructure & Nano Energy Laboratory, the Quantum Transport Laboratory, the Thin Film Physics Laboratory and so on, covering a total floor area of 5,000 square meters.

1. 环镜球差校正透射电子显微镜 Environmental Cs Corrected TEM
2. 静电纺丝机 Electrospinning machine
3. 表面分析系统 Surface analysis system
4. 2018年3月 Quantum Gravity 会议
Quantum Gravity Conference 2018
5. 澳大利亚国立大学来我系交流
Exchanges with Australian National University



Exchanges & Cooperation



对外交流

Exchanges & Cooperation

2017 年以来, 我系举办学术报告 350 余场、南科大讲堂 16 场; 累计接待杰青、两院院士、诺奖获得者等高水平专家超过百人。此外我系举办了 QIP2020、“新材料与能源科学”高峰论坛、香港深圳量子信息联合会议等国际学术会议和论坛, 邀请国内外本领域的学术带头人与科研新秀来访交流。

Since 2017, our department has held more than 350 academic reports and 16 SUSTech lectures; received over 100 high-level experts including outstanding youths, academicians of the Chinese Academy of Sciences and Chinese Academy of Engineering, and Nobel Prize winners. Besides, our department organized international academic conferences and forums such as QIP2020, “New Materials & Energy Science” Summit Forum, and Hong Kong-Shenzhen Workshop on Quantum Information Science. Academic leaders and young research talents in physics at home and abroad are welcomed to exchange views here.

物理系积极组织师生到世界各地参加各类学术会议, 宣传我系的优秀工作成果, 与各国专家学者一起探讨学术研究的前沿动态与发展趋势。另外从 2016 年起, 南科大物理系与北京大学、哈尔滨工业大学、香港大学、香港科技大学、新加坡国立大学、利兹大学等境内外知名高校开展研究生联合培养, 满足双校毕业标准和论文要求的学生可获得合作高校学位以及南科大学历证明。

The Department of Physics is active in organizing events for teachers and students to get more engagement in various academic conferences around the world, to publicize our excellent achievements, and to exchange the latest updates and development trends in academic researches. Since 2016, the Department of Physics started to conduct joint training programs with Peking University, Harbin Institute of Technology, University of Hong Kong, Hong Kong University of Science and Technology, National University of Singapore, University of Leeds, and other prestigious universities at home and abroad. Double academic degrees will be conferred on students who have satisfied the requirements for graduation at each of the universities.

学子风采 Meet Our Students

从 2011 年开始，物理系开始招收本科生。据统计，历届本科生共参与科研项目 50 项（学生为项目负责人），其中 5 项国家级大创项目，9 项省级大创项目，4 项省级攀登项目；发表 SCI 论文 90 余篇，其中以一作或共同一作发表近 30 篇。部分学生在物理学顶级期刊 Phys. Rev. Lett.、Phys. Rev. X 上以第一作者发表论文；获授权专利 3 项，其中一作 2 项；获省级以上学科竞赛奖励 100 项。物理系大部分本科毕业生选择继续深造，包括境外升学、境外联培、保研、考研等，近三届毕业生深造率分别为 84%、86%、77%。

从 2016 年开始，南科大与北京大学、哈尔滨工业大学、香港大学、香港科技大学、新加坡国立大学、利兹大学等境内外知名高校开展研究生联合培养。2018 年，物理学科分别获得物理学一级学科硕士、博士学位授权点，开始培养南科大自主研究生。物理系研究生的科研成果令人瞩目，仅在 2021 年，物理系研究生在国际一流期刊上

发表论文 108 篇，研究生作为一作或共同一作的论文接近半数。毕业生理论基础扎实、科研能力突出，广泛活跃在北大、牛津等国内外高等院校和科研机构。

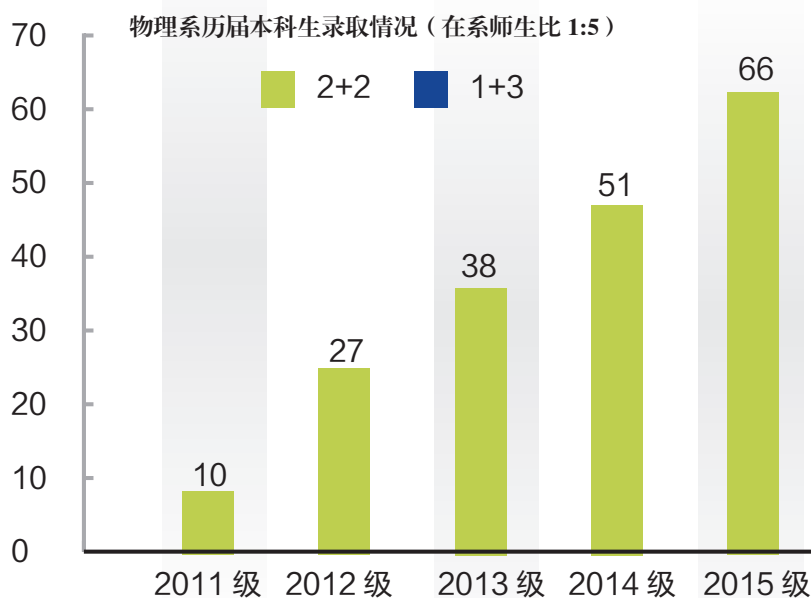
Up to now, our undergraduates have participated in 50 scientific research projects at both state and provincial levels. Their researches are also fruitful, with over 90 papers being published on SCI journals, 30 of which were finished as the first or co-first author. They have multiple patents and have excellent performance at various competitions. Since 2016, SUSTech has carried out joint postgraduate training program with Peking University, Harbin Institute of technology, University of Hong Kong, National University of Singapore, Leeds University and other well-known universities at home and abroad. In 2018, the Department started to recruit postgraduates independently. The research achievements of our postgraduates are remarkable. In 2021 alone, they published 108 papers on world-class journals, and nearly half of the papers were finished by students as the first or co-first author. Graduates have a solid theoretical foundation and outstanding scientific research ability. Our graduates have furthered their study in renowned universities or research institutions.

硕士研究生培养情况一览表

培养学校	2016 级	2017 级	2018 级	2019 级	2020 级	2021 级
南科大自主				46	50	50
哈工大联培	19	29	35			

博士研究生培养情况一览表

培养学校	2016 级	2017 级	2018 级	2019 级	2020 级	2021 级
南科大自主				31	29	27
哈尔滨工业大学	4	8	19	3		
北京大学	2		1			
澳门大学	2		1			
香港大学	3	4	4	1	2	2
香港科技大学	3	4	3	2	3	
香港理工大学				1		
香港浸会大学				1		
新加坡国立大学		1	3	3	1	
悉尼科技大学			2			
昆士兰大学				1	1	
利兹大学			1			
香港城市大学						2
学生总人数	14	17	34	43	36	31



学生动态

Student's Activities

2020 年 1 月，物理系 2017 级本科生王凌飞、钟海文和其他队员组成的参赛团队在“2019 年美国大学物理竞赛”中获得银奖。

In January, 2020, Lingfei WANG, Haiwen ZHONG (class of 2021) got silver award in the 2019 University Physics Competition.

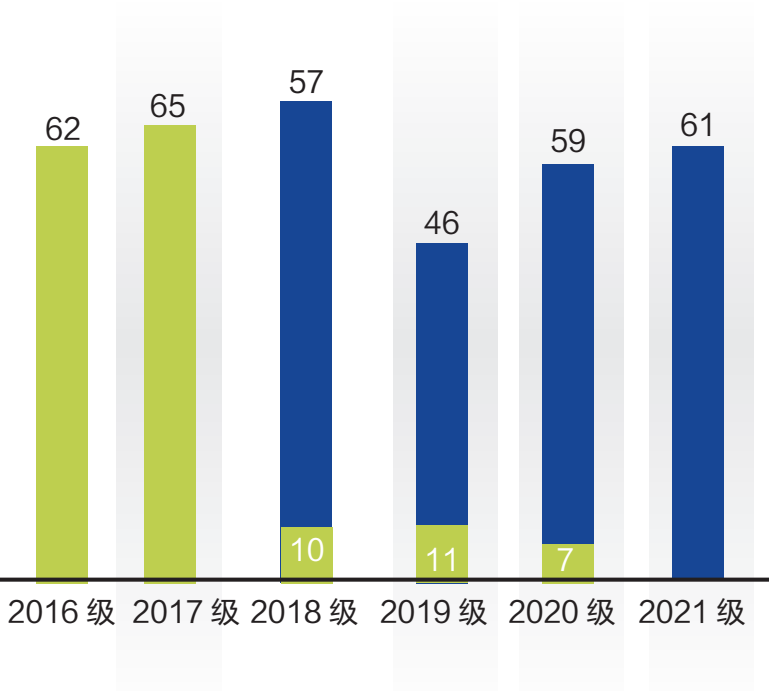
2020 年 1 月，物理系 2017 级本科生田致远、冯锴和其他队员组成的参赛团队在“2019 年美国大学物理竞赛”中获得银奖。

In January, 2020, Zhiyuan TIAN, Kai FENG (class of 2021) got silver award in the 2019 University Physics Competition.

2020 年 8 月，物理系 2018 级本科生卞凯明、邵天浩和其他队员组成的参赛团队在“2020 中国大学生物理学术竞赛（中南赛区）”中获省级三等奖。

In August, 2020, Kaiming BIAN, Tianhao SHAO (class of 2022) won the third prize at provincial level in China Undergraduate Physics Tournament (Central South Division)

2020 年 12 月，物理系 2019 级本科生肖天翼、江一帆和其他队员组成的参赛团队在“2020 全国大学生物理实验竞赛”中获国家级一等奖。



In December, 2020, Tianyi XIAO, Yifan JIANG (class of 2023) won the first prize at state level in the 2020 National College Student Physics Experiment Competition.



为庆祝中国共产党百年华诞，2021 年 6 月-7 月 2019 级博士生周良、陈见，以及研究生第一、第二党支部委员和党员策划组织党史知识竞赛活动，以“强国梦文创桌游”为载体乐学党史。

To celebrate the 100th anniversary of the CPC, doctoral students Liang ZHOU, Jian CHEN and other members of Postgraduate's Party Committees organized a Party history contest.

2021 年 7 月，物理系 2020 级本科生姚健在第七届全国大学生物理实验竞赛（教学赛）中获得二等奖。

In July, 2021, Yao Jian (class of 2024) won the second prize in the 7th National College Student Physics Experiment Competition (Teaching Competition).

2021 年 8 月，物理系 2018 级本科生周滢瑶在第二届“华数杯”全国大学生数学建模竞赛中获得一等奖。

In August, 2021, Zhou Yingyao (class of 2022) won the first prize in the 2nd HuaShu Cap Math Modeling Competition.

2021 年 10 月，物理系 2020 级本科生陈登科及队员在第四届 APAC HPC-AI 挑战赛中获得总冠军。

In October, 2021, CHEN Dengke (class of 2024) won the champion in the 4th APAC HPC-AI Challenge.

2021 年 11 月，物理系学生黄梓晋、侯力文、罗翊原、戴越、成云显在第七届全国大学生物理实验竞赛决赛（创新赛）中获得团体一等奖。

In November, 2021, HUANG Zijin, HOU Liwen, LUO Yiyuan, DAI Yue, CHENG Yunxian as a group won the first prize in the 7th National College Student Physics Experiment Competition Finals (Innovation Competition).

毕业生风采

Excellent Graduates



夏亦宇

Yiyu XIA

2022 届物理系本科毕业生。毕业后前往康奈尔大学应用物理系进行博士学习。本科期间获得优秀学生一等奖学金。2021 年 9 月，他凭借过硬的实力被南科大－麻省理工机械工程教育科研中心的项目选中，成为 MIT 本科生交换项目的 9 名幸运儿之一，来到麻省理工学院交流学习。

Yiyu XIA, undergraduate of class of 2022. After graduation, He went to the Department of Applied Physics of Cornell University for doctoral study. He won the first-class scholarship for outstanding students during his undergraduate period. In September 2021, he was selected by the project of SUSTech and the mechanical engineering education and research center of MIT. He became one of the students in the MIT undergraduate exchange program..

2022 届南科大－哈工大联培博士生。2022 年南方科技大学“研究生十佳毕业生”获得者。在徐虎教授的指导下从事第一性原理计算、电催化方向研究。毕业后前往扬州大学担任副教授。研究生期间获得博士国家奖学金、物理系研究生优秀党员等多项荣誉。

Zhe ZHANG, Ph.D graduate of SUSTech-HIT joint program. He has been honored Postgraduate Summa Cum Laude of SUSTech in 2022. Under the guidance of Professor Hu XU, he was engaged in first principle calculation and electrocatalysis research. After graduation, he went to Yangzhou University as an associate professor. During his postgraduate period, he won the national scholarship for doctorate and the excellent Party member of the graduate student of the Department of physics.



张哲
Zhe ZHANG



1. 参观“大潮起珠江 广东改革开放 40 周年”展览
A Visit to "The 40th Anniversary of Reform and Opening in Pearl River, Guangdong" exhibition
2. 研究生党支部广州红色之旅活动
Postgraduate Party Building Activity in Guangzhou
3. 2022 年毕业活动
Graduation activities in 2022
4. 新生沙滩足球赛
Beach Soccer Game of the Freshmen
5. 体育活动
Sports Activity







联系我们
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何佳清 Jiaqing HE

系主任、讲席教授
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1998 年获得武汉大学物理学学士学位；2004 年获得武汉大学和德国于利希研究中心联合培养的物理学博士学位，师从著名电子显微镜专家 Knut Urban 教授和王仁卉教授；博士毕业后 2004–2012 年先后在美国布鲁克海文国家实验室和美国西北大学工作。现为南方科技大学物理系讲席教授，研究方向主要包括透射电子显微学、热电材料和结构与物理性能关联性。何佳清教授在 SCI 杂志上发表论文 250 余篇，其中包括 Nature 和 Science 等影响因子大于 10 的论文近 150 篇。文章被引用 27000 多次，H 因子 79。近年来主持国自然重点等科研项目 10 余项。

Jiaqing He is a full professor at Southern University of Science and Technology (SUSTech). He received his joint

Ph.D. degree in physics from both Juelich Research Center and Wuhan University in 2004. He was a post-doctor at

Brookhaven National Laboratory (2004–2008), research associate (2008–2010) and research assistant professor (2010–2012) at Northwestern University. His research interests include transmission electron microscopy, thermoelectric materials, and structure and property relationship. He has published over 250 papers on SCI journals, including Nature and Science, and his papers have been cited over 27,000 times with a h-index 79. He's also presided over 10 state-level research projects.



陈朗 Lang CHEN

科研副主任、教授
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曾为美国马里兰大学博士，法国国家科研中心博士后。获得了深圳市海外高层次人才“孔雀计划”B 类人才启动经费支持和 2015 年度深圳市鹏城学者凝聚态物理长期特聘教授称号。目前共发表论文 140 多篇，包括 Nature 子刊, PRL, Adv. Mater. 等一流期刊，被引大于 4500 次，H 因子 36。目前共主持过各类科研经费 3000 多万元。

Prof. Chen obtained his Ph.D. in University of Maryland and worked as postdoc fellow in CNRS, France. He has

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