

Department of Physics and Astronomy

<http://www.physics.sjtu.edu.cn/en/>

I . An Introduction to Disciplines and Main Research Fields

The Department of Physics and Astronomy has the primary discipline of physics, including Theoretical and Interdisciplinary Physics, Particle and Nuclear Physics, Laser Plasma Physics, Condensed Matter Physics, Optics Science and Engineering, and Astronomy and Astrophysics, and has two post-doctoral programs of physics and optics science. The Condensed Matter Physics and the Optics Science and Engineering became State Key Academic Programs in 2002 and 2007 respectively. In the 2012's Discipline Level Ranking of Ministry of Education, physics ranked the sixth place and it was selected in "disciplines construction plans (class A) of colleges and universities in Shanghai" in September 2012.

Disciplines and Main Research Fields

Disciplines	Research Fields
Theoretical and Interdisciplinary Physics	Focusing on the cutting-edge studies of electron transport and superconductivity in the condensed matter, soft condensed matter physics, complex physics systems, theoretical biophysics, statistical physics, low-dimensional condensed matter theory, quantum field theory, phase transition theory, etc.
Nuclear and Particle Physics	Focusing on the theoretical and experimental frontiers of particle and nuclear physics, including neutrino, nuclear structure, quantum chromodynamics and dark matter.
Laser Plasma Physics	Focusing on the frontiers of physics and key technology of high energy density matter, including novel particle acceleration and radiation sources, novel laser fusion, laboratory simulation of astrophysical phenomena, and ultrafast dynamics of physical structure.
Condensed Matter Physics	Focusing on the cutting-edge studies of topological insulators and topological superconductors, high-temperature superconductivity, semiconductor physics, surface and interface physics, soft matter physics, condensed matter spectroscopy, computational condensed matter physics, optoelectronic device physics, and solar energy and energy physics.

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Disciplines	Research Fields
Optics Science and Engineering	Focusing on the basic frontiers of optical physics, including nonlinear optics, nanophotonics and quantum optics, and the application of optical fiber, optical waveguide, optical instruments and solar cell.
Astronomy and Astrophysics	The research is mainly focused on the formation and evolution of stars, galaxies, galaxy clusters, and large scale structure of the universe, conducted through the experiment, observation and simulation of astronomy and astrophysics at multi-wavebands from radio, infrared, optical, to X-ray and Gamma-ray. The research includes the physical properties and spatial distribution of baryons and dark matter particles, black hole and its impact on the galaxy activity, supernova and Gamma-ray burst, the first generation of celestial bodies, the re-ionization of the universe, etc.

II . Faculty

1. Overview of Faculty

The Department of Physics and Astronomy currently has more than 70 doctoral supervisors, including five academicians of the Chinese Academy of Sciences, one academician of the Chinese Academy of Engineering, five distinguished professors of the Thousand Talents Plan of China, two experts of National High-Level Personnel of Special Support Program, 18 winners of the National Science Fund (NSF) for Distinguished Young Scholars, 11 professors of Chang Jiang Scholars Program, six experts of the Thousand Talents Plan of Shanghai, three winners of the National Science Fund for Outstanding Youths, 22 members of the Thousand Talents Plan (youth), and one member of the Top-notch Young Talents Plan.

2. Renowned Professors

No.	Name	Position	Research Interests
1	LI Jiaming	Academician, Chinese Academy of Sciences Member	Atomic and Molecular Physics
2	LEI Xiaolin	Academician, Chinese Academy of Sciences Member	Semiconductor Electron Transport and Optical Properties
3	ZHANG Jie	Academician, Chinese Academy of Sciences Member, winner of NSF for Distinguished Young Scholars	Laser Plasmas
4	PAN Jianwei	Academician, Chinese Academy of Sciences Member, Winner of NSF for Distinguished Young Scholars	Quantum Physics

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No.	Name	Position	Research Interests
5	WU Xiangping	Academician, Chinese Academy of Sciences Member, Winner of NSF for Distinguished Young Scholars	Cosmology
6	FAN Dianyuan	Academician, Chinese Academy of Engineering Member	Laser Physics
7	JI Xiangdong	Distinguished Professor of the Thousand Talents Plan, Chang Jiang Scholar	Dark Matter Detection Experiments
8	CAI Shenou	Distinguished Professor of the Thousand Talents Plan, Chang Jiang Scholar	Theoretical Physics
9	HE Xiaogang	Distinguished Professor of the Thousand Talents Plan	Particle Physics Theory
10	WANG Xijie	Distinguished Professor of the Thousand Talents Plan	Laser Accelerator
11	LIU Ying	Distinguished Professor of the Thousand Talents Plan, Chang Jiang Scholar	Superconductivity Nano Physics
12	JING Yipeng	Winner of NSF for Distinguished Young Scholars	Cosmology
13	WANG Xiaoqun	Winner of NSF for Distinguished Young Scholars	Correlated Electron Systems and Quantum Control
14	QIAN Liejia	Winner of NSF for Distinguished Young Scholars	Ultrafast Nonlinear Optics
15	YANG Xiaohu	Chang Jiang Scholar, Winner of NSF for Distinguished Young Scholars	Astrophysics
16	ZHANG Pengjie	Winner of NSF for Distinguished Young Scholars	Cosmology
17	CHEN Xianfeng	Winner of NSF for Distinguished Young Scholars	Nonlinear Optics
18	XU Haiguang	Winner of NSF for Distinguished Young Scholars	Astronomy and Astrophysics
19	ZHAO Yumin	Winner of NSF for Distinguished Young Scholars	Nuclear structure theory

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No.	Name	Position	Research Interests
20	SHEN Wenzhong	Chang Jiang Scholar, Winner of NSF for Distinguished Young Scholars	Solar Photovoltaic Science and Technology
21	YAO Xin	Chang Jiang Scholar	Crystal Growth and Mechanism
22	SHENG Zhengming	Chang Jiang Scholar, Winner of NSF for Distinguished Young Scholars	Laser Plasmas
23	JIA Jinfeng	Chang Jiang Scholar, Winner of NSF for Distinguished Young Scholars	Surface Physics
24	WANG Bin	Chang Jiang Scholar, Winner of NSF for Distinguished Young Scholars	Theory of Gravity
25	QIAN Yongzhong	Chang Jiang Scholar	Neutrino Physics
26	LI Yijie	Distinguished Professor of SJTU	Superconducting Materials and Physics
27	SUN Hong	Distinguished Professor of SJTU	Material Calculation Physics
28	SUN Yang	Distinguished Professor of SJTU	Nuclear Physics
29	ZHU Kadi	Distinguished Professor of SJTU	Solid-state Quantum Information and Quantum Computation
30	XING Xiangjun	Distinguished Professor of SJTU	Soft Condensed Matter Theory

III. Achievements

In the last five years, the Department of Physics and Astronomy has been in charge of 509 projects, of which there are 58 national key projects whose grants are over RMB1000,000, including one innovative research groups of National Natural Science Foundation of China (NSFC), one key scientific instrument and equipment development project of NSFC, nine key programs of NSFC, four major research plans of NSFC, two Special Funds of NSFC, three Distinguished Young Scholar Funds, three Excellent Young Scholar Funds of NSFC, 15 national key basic research projects of the Major National Basic Research Program (973) of Ministry of Science and Technology (MOST) (of which there are two chief scientist projects), one Youth 973 Program of MOST, one National High Technology Research and Development Program (863 Program) of MOST, one Major Research Program of MOST and one Iter Program of MOST. In 2014, IFSA Collaborative Innovation Center led by the Department of

Physics and Astronomy of Shanghai Jiao Tong University as well as the Artificial Microstructure and Quantum Control Collaborative Innovation Center (led by Nanjing University) which the Department of Physics and Astronomy of SJTU participated in were all successfully certificated.

In terms of the basic cutting-edge studies and applied basic research, the Department of Physics and Astronomy has made a number of internationally influential or world-leading achievements in numerous disciplines. In the last five years, the department has published more than 1500 papers, of which nearly 200 were published in international top journals like *Science*, *Nature and Its Series*, *Physical Review Letters*, and *Proceedings of the National Academy of Sciences of the USA* (PNAS), and 2 papers are elected to the ranks of China one hundred most influential domestic and international academic papers. Due to significant achievements, many faculty have received a series of major scientific awards, including one “Asian Achievement Award” of International Organization of Chinese Physicists and Astronomers, one Humboldt Research Award of German Humboldt Foundation, one 2015 Outstanding Nuclear Physicist Award from Jefferson Science Associates (JSA), one Association of Asia Pacific Physical Societies (AAPPS) Chen Ning Yang Award, two Second Prize of National Natural Science Awards, one Second Prize for Science & technology Achievement of the Ministry of Education, and one Second prize of Shanghai Technology Progress Award.

V. International Collaboration

The Department of Physics and Astronomy establishes close partnership with many famous overseas research institutes on academic exchange and academic cooperation, including the Department of Physics in the University of Maryland (UMD), the Department of Physics in the University of Illinois at Urbana-Champaign (UIUC), the Department of Physics in the University of Michigan (UM), California Institute of Technology (CIT), Lawrence Berkeley National Laboratory (LBNL), the Department of Physics in Duke University, the Department of Physics in The Pennsylvania State University (PSU), Max Planck Institute in Germany, Rikagaku KENkyusho/Institute of Physical and Chemical Research (RIKEN), the Department of Physics in Osaka University, The Institute for Solid State Physics of The University of Tokyo, the Department of Physics in Monash University, the Department of Physics in The University of New South Wales (UNSW), and the Department of Physics in The Hong Kong University of Science and Technology (HKUST).

Substantial exchanges and cooperation are developed through establishing joint laboratories, international scientific research cooperation projects, undergraduate exchange programs and combined training projects for graduate students. With respect to the international talent training, the Department of Physics and Astronomy opens international classes for undergraduate education, sets up international curriculum system, exchanges undergraduate students and joint training graduate students with the above overseas physics

departments. Meanwhile, the Department of Physics and Astronomy expands the enrollment of international students, promotes training of exchange students through the combination of master's and doctoral education as well as multi-channel training during graduate stage.

V. Platforms for Scientific Innovation

- (1) Key Laboratory for Laser Plasma, Ministry of Education
- (2) Key Laboratory of Artificial Structures and Quantum Control, Ministry of Education
- (3) National Key Laboratory of Advanced Optical Communication Systems and Networks
- (4) Shanghai Key Laboratory for Particle Physics and Cosmology
- (5) IFSA joint research center of Ministry of Education
- (6) Artificial Microstructure Science and Technology Collaborative Innovation Center
- (7) Shanghai Center for Complex Physics Research
- (8) Li Zhengdao Institute

VI. Distinguished Alumni

(1) WANG Daohan, graduate of 1932, once serving as secretary of the CPC Shanghai Municipal Committee, Shanghai mayor, the president of the Association for Relations across the Taiwan Strait.

(2) KUANG Dingbo, graduate of 1949, academician of the Chinese Academy of Sciences Member, infrared optical expert.

(3) GONG Changde, graduate of 1950 (studied in the Department of Physics and Astronomy in SJTU in 1950, transferred to Fudan University in 1952 due to faculty adjustment and graduated from Fudan University in 1953), academician of the Chinese Academy of Sciences Member, condensed matter theoretical physicist.

(4) GU Min, graduate of 1978, academician of the Australian Academy of Sciences and Engineering Academicians.

(5) YE Jun, graduate of 1985, academician of the American National Institute of Standards and Technology, academician of the Academy of Sciences.

(6) DING Hong, graduate of 1986, expert of The Recruitment Program of Global Experts, condensed state physics laboratory chief scientist.