

## 070200 物理学 2024 级全日制普博士生培养方案

### 2024 Full-time PhD Program for Physics (Regular Doctoral Students)

#### 一、基本信息 Basic Information

院系名称 School	李政道研究所 Tsung-Dao Lee Institute (TDLI)	适用年级 Grade	2024 级 Class		
适用专业 Major	物理学 Physics	标准学制 Duration	4 年 Years		
学习形式 Study Mode	全日制 Full time				
项目类型 Program Type	学术型 Academic				
培养层次 Program Level	普博生 Regular Doctoral Students				
最低学分 Min Credit	12	最低 GPA 学分 Min GPA Credit	0	最低 GPA Min GPA	0

#### 二、学科简介 Introduction

上海交通大学物理学科始建于 1906 年，近年来发展迅速，学科水平不断提升。在全国第四轮一级学科评估中进入 A 档，2019 年入选上海市高峰高原学科，2020 年 QS 学科国际排名首次进入前 50 名。

物理学科现拥有理论物理、粒子物理与核物理、凝聚态物理（国家重点学科）、光学（国家重点学科）、原子分子物理、激光等离子体物理（国防特色学科）、计算物理及软凝聚态物理等学科方向，是国内物理学科专业门类最为齐全的物理院系之一。近年来本学科引进和培养了一大批国内外知名专家学者，形成了一支极具竞争力的高水平师资队伍。

本学科坚持以“立德树人、教书育人”为中心，以“培养拔尖创新人才”为宗旨，以“创新性、多元化和国际化”为驱动，全面提升学生的社会责任感、创新精神、实践能力、人文情怀和全球视野，致力于培养德才兼备、数理基础扎实并具备服务国家重大战略需求能力的高水平创新型人才。研究生培养重点推进培养过程中的质控建设，实行严格的博士资格考试和分流淘汰机制；实施致远荣誉博士计划，引导学生潜心高水平的前沿研究，极大提升科研创新水平；多渠道加强和支持学生国际学术交流，拓展国际化视野。

The discipline of Physics in Shanghai Jiaotong University was founded in 1906. In recent years, it has developed rapidly and the level of discipline is constantly improving. In the fourth round of national first level discipline evaluation, it got the rank A. And in 2019, it was selected into program of “Shanghai peak and plateau disciplines”. In QS world University Ranking by subject 2020: Physics & Astronomy, it is in the top 50.

The discipline now has several sub-disciplines including theoretical physics, particle and nuclear physics, condensed matter physics (national key discipline), optics (national key discipline),

atomic and molecular physics, laser plasma physics (national defense characteristic discipline), computational physics and soft condensed matter physics. It is one of the few physics departments that have nearly complete sub-disciplines of Physics in China. In recent years, many existing well-known experts together with newly joined famous members form a highly competitive and high-level faculty team.

The discipline adheres to the "fostering integrity and promoting rounded development of people" as the core, the "cultivation of top-notch innovative talents" as the purpose, and "innovation, diversification and internationalization" as the driving force to comprehensively improve students' social responsibility, innovative spirit, practical ability, humanistic feelings and global perspective, and is committed to train innovative student with both political integrity and ability, solid mathematical and physical foundation and ability to serve the major strategic needs of the country. Postgraduate training emphasizes the quality control during the training process; executing doctoral qualification examination; implementing the Zhiyuan honorary doctor program to guide students to concentrate on important frontier researches; strengthening and supporting international academic exchanges of students through multiple channels to expand international vision.

### 三、培养目标 Program Objective

恪守学术道德规范，崇尚科学精神，对学术研究，特别是对物理学的基础和应用基础研究有浓厚兴趣，具备良好的学术潜力。在科研选题、研究方法和创新能力等方面经过系统训练，具有独立从事物理学及相关领域或跨学科创新性科学研究工作和相关领域实际工作的能力。

通过进行课程学习和文献阅读及科学研究等，对本学科相关领域的学术研究前沿动态把握准确，具有坚实的基础理论、宽广的相关知识背景、系统深入的专业知识及相应的实验技能和方法，对获取的知识和研究方法能够透彻理解并灵活应用。能够发现并提出有价值的科学问题，并针对问题独立设计合理的研究方案，对研究所取得的数据进行恰当的处理和分析，并形成结论及发表研究成果。

具备一定的学术鉴别能力和学术创新能力，以及良好的团队合作能力。掌握一门外国语，能够熟练阅读本学科相关领域的外文资料，并具有较强的科研论文写作能力和进行国际学术交流的能力。

Abide by academic ethics and uphold the spirit of science, students have strong interests in academic research, especially in the fundamental and applied basic research of physics, and has good academic potential. After systematic training in scientific research topics, research methods and innovation ability, students have the ability to independently engage in innovative scientific researches and practical work in physics and related fields or interdisciplinary fields.

Through the course study, literature reading and scientific research, student can accurately grasp the academic research frontier in the related fields of this discipline. Students should have solid knowledge on basic theory, broad background knowledge, systematic and in-depth professional knowledge and corresponding experimental skills. Students can thoroughly understand and flexibly apply the acquired knowledge and research methods. Students should have the ability to find or raise valuable scientific problems and design reasonable strategy to solve the problems independently. Students can analyze the research results and scientific findings, then write a research article for

publication.

Students should have certain academic identification ability and academic innovation ability, as well as good team cooperation ability. Students can master a foreign language, be able to read literatures in foreign language in related subject, and have strong ability of writing research papers and international academic exchanges.

#### 四、培养方式及学习年限 Training Mode and Study Duration

全日制学术型普博生学习年限为 4 年。未能按时完成学业者，博士生最长可延长 2 学年。

The length of study for full-time academic regular doctoral students is 4 years. For those who fail to complete their studies on time, the longest extension of doctoral students is 2 years.

#### 五、课程学习要求 Course Requirement

须修读完成总学分不少于 12，课程学习原则上要求在第一学年内完成。

The total credits should not be less than 12. Laboratory safety education is a compulsory course. In principle, the course should be completed within the first academic year.

#### 六、培养过程要求 Training Requirement

普博生资格考试一般在第一学年春季学期或第二学年秋季学期进行，通过者方可进入博士学位论文开题环节，未通过者可以申请参加第二次资格考试，重考仍未通过者，由院系考核小组基于学业考核作出“转为硕士生培养”的建议，由学院学位评定委员会审议同意后进行分流。

通过资格考试的普博生，应在第二学年内进行博士学位论文开题，首次学位论文开题未通过的，可在下一学期再次申请开题，再次论文开题仍未通过者，由院系考核小组基于学业考核作出“转为硕士生培养”的建议，由学院学位评定委员会审议同意后进行分流。

开题通过后的普博生应参加学科组织的年度考核，年度考核未通过者由院系考核小组基于学业考核作出“转为硕士生培养”或“结业”的建议，由学院学位评定委员会审议同意后进行分流。

博士研究生应具备学术交流的能力，在读期间必须在高水平国际学术会议上作学术交流至少 1 次。交流形式、会议层次等具体要求详见《上海交通大学关于博士研究生参加学术交流的规定》。

The qualification examination is usually conducted in the spring semester of the first academic year or the autumn semester of the second academic year. Only those who pass the examination can begin the thesis proposal session of doctoral dissertations. Those who fail to pass the qualification examination can apply for the second chance of examination. Qualify examination committee will file the suggestion of "change to the training of master's degree" to the academic degree evaluation Committee of the school for students who failed in examination twice. Those students will change to

master after the approval by the the academic degree evaluation Committee.

Students passed the qualification examination should begin the thesis proposal of their doctoral dissertations within the second academic year. Those who fail to pass the thesis proposal can apply for thesis proposal again in the next semester. Those who fail twice will be advised to "change to the training of master's degree" by the academic degree evaluation Committee of the college.

Students passed thesis proposal should participate in the annual assessment organized by the sub-discipline. Those who fail to pass the annual assessment will be advised to "change to the training of master's degree".

Doctoral students should have the ability of academic exchange. During their study, they must make academic exchange at a high-level international academic conference at least once. See regulations of Shanghai Jiaotong University on doctoral students participating in academic exchanges for specific requirements such as communication form and conference level.

## 七、学术成果要求 Requirement on Academic Achievements

博士学位论文相关创新成果应在本学科领域体现一流水平、具有创造性；成果应为学位申请人攻读博士学位期间独立完成，并以学位论文的形式完整呈现。成果的创新性是评价学位论文水平的重要参考，可通过高水平的学术期刊论文、尖端仪器设备研制等多种形式呈现。具体要求按“物理与天文学院博士学位论文创新性成果认定细则”（2023年修订版）执行。

The relevant innovative achievements of doctoral dissertation should reflect the first-class level and originality in the field of the discipline; The results shall be completed independently by the degree applicant during his doctoral degree study and presented in the form of a dissertation. The innovation of achievements is an important reference for evaluating the level of dissertation, which can be presented in some forms, such as high-level academic journal papers, cutting-edge instrument and equipment development and so on. The specific requirements shall be implemented in accordance with the "detailed rules for the identification of innovative achievements of doctoral dissertations of the School of Physics and Astronomy, Shanghai Jiao Tong University" (Revised version 2023).

## 八、学位论文 Thesis/dissertation work

博士学位论文是博士生在导师或导师组集体指导下，独立完成的、系统完整的学术研究工作的总结，应在科学上或专门技术上作出创造性的学术成果，能反映出博士生已经掌握了坚实宽广的基础理论和系统深入的专门知识，具备了独立从事科学研究工作的能力。博士学位论文应包括文献综述、选题意义、研究内容、研究方法、研究结果、讨论与结论等内容。

博士学位论文的撰写应符合学校关于学位论文的规范性和质量的要求，并按照学校规定的格式打印，具体要求请参阅《上海交通大学博士、硕士学位论文撰写指南》。论文一般应以中文书写，如有特殊情况（例如论文被指定参加国际专家评审和国际答辩，或该研究生不具有中文写作能力）需要用英文写作，则需要向学院学位评定委员会申请并获批准，上报研究生院备

案。

博士学位论文评审一般于答辩前三个月进行，关于学位论文预答辩、论文评审、答辩的具体要求请参阅《上海交通大学关于申请授予博士学位的规定》。

Doctoral dissertation is the summary of systematic and complete academic research work independently completed by doctoral students under the guidance of a supervisor or a group of supervisors. It should make creative academic achievements in science or special technology. It can reflect that doctoral students have mastered solid and broad basic theory and systematic and in-depth expertise, and have the ability to independently engage in scientific research. The doctoral dissertation should include literature review, significance of research topic, research content, research methods, research results, discussion and conclusion.

The writing of doctoral dissertations should meet the requirements of the University on the standardization and quality of dissertations, and should be printed in the format prescribed by the University. For the detailed requirements, please refer to the “Guidelines for writing doctoral and master's degree theses of Shanghai Jiaotong University”. Generally, the thesis should be written in Chinese. In case of special circumstances (such as the thesis is appointed to participate in the international review and international defense, or the postgraduate does not have the ability to write in Chinese), students should apply to the academic degree evaluation committee of the college for approval and the case will be filed at the graduate school of University.

The evaluation of doctoral dissertations is generally conducted three months before the oral defense. For the detailed requirements of pre-defense, thesis review and defense, please refer to “The regulations on applying for doctoral degree of Shanghai Jiaotong University”.

## 九、课程设置 Courses

另见课程设置列表 Please see also the curriculum list.