

物理学科（070200）博士研究生

培养方案（留学生）

Academic Doctoral Candidates in Physics (070200)

[Physics]

一、 领域简介 Introduction

物理学科近五年来，已培养博士生九十余名，硕士研究生四百多名，毕业生就业率（包括升学率）连续多年保持在 95% 以上。研究生培养曾获得上海市教委优秀教学成果奖，研究生多人获得上海市优秀博士论文奖、上海市硕士优秀论文奖、校优秀论文等；本学科培养的毕业生集中在国内外高校、科研单位和大型企业，其中多人已成为学科和企业的骨干力量。根据 ESI 数据库 2022 年 5 月数据，上海大学物理学科发表论文总数（3494 篇）和总引用率（41183 次）等指标在进入全球前 1% 的全国地方高校中排名第 3，处于全球前 7.2%。

In the past five years, the physics subject of Shanghai University has more than 90 doctoral graduates and more than 400 master's graduates. The employment rate of graduate students in the physics department remains more than 95% in the past years. Several students were awarded with the Shanghai excellent doctoral thesis award, won the Shanghai excellent master thesis award and excellent master thesis of Shanghai University. The graduates are concentrated in domestic and foreign universities, scientific research institutions and large enterprises, many of whom have become the backbone of the discipline and enterprises. According to the data of the ESI database in May 2022, Shanghai university ranks first among the top 3% local universities in China in terms of the total number of published papers (3,494) and the total citation rate (41,183 times), ranking among the top 7.2% in the world.

上海大学物理学科师资力量雄厚，目前拥有包括中科院院士、外籍院士、国家级高端人才、国家级海外高端青年人才、上海市海外高端人才、上海市领军人才等专职教师 92 人，含全职外教 6 人，正高 36 人，副高 38 人，教师队伍中有

博士学位者达到 100%。拥有教育部特色专业、上海市重点学科、上海市教育高地、上海市实验教学示范中心、学校“211”重点学科建设方向、上海市高原学科等学科建设平台。

The physics subject of Shanghai University boasts a team of Chinese Academy of Sciences, foreign academician, national high-level talents, national overseas high-level young talents, Shanghai overseas high-level talents, and Shanghai Leaders, including 6 full-time foreign teachers, 36 professors and 38 vice professors, with all the teachers have doctoral degree. It has the characteristic majors of the Ministry of Education, The key disciplines of Shanghai, Shanghai Education highland, Shanghai Experimental Teaching Demonstration Center, the "211" key discipline construction direction, Shanghai Plateau disciplines and other discipline construction platforms.

上海大学物理学科面向物理学科国际学术前沿方向、围绕国家发展战略和上海市产业经济重大需求,以物质科学前沿问题为对成和发展了以下具有特色的研究方向:超导与强关联物理、低维与计算物理、量子与信息物理、引力与高能物理、新能源物理与器件以及纳米结构物理等。主要研究基地包括上海市高温超导重点实验室、上海市量子与超导新物态前沿科学研究基地、上海大学量子与分子结构国际中心、上海大学—索朗光伏材料与器件联合实验室、上海大学低维碳材料研究所、上海大学纳微能源研究所、上海大学理论物理研究所、上海大学超快光子学实验室、上海大学定量生命科学国际研究中心和量子人工智能科学技术研究中心等。

The Department of Physics at Shanghai University promotes excellence in a range of research areas including Superconductors, Low Dimensional and Computational Physics, Quantum physics and Information, Optics, Gravitation and High Energy Physics, Nanostructures Physics, etc. The Department of Physics has many laboratories which are equipped with excellent research facilities, such as: Shanghai Laboratory of High Superconductivity, International Center for Quantum and Molecular Structure, Joint Laboratory for Photovoltaic Materials, Research Institute of Low Dimensional Carbon Materials, Research Institute of Micro Energy, Institute of Theoretical Physics, Ultrafast Photonics Laboratories and Center for the

Quantum Science and Artificial Intelligence etc.

二、 学位标准 Degree Standards and Requirements

获得上海大学物理学博士学位要求掌握物理学及其相关领域的基本理论知识,对所研究领域的前沿和发展有较深入的了解。具有独立开展科学研究的能力。掌握至少一门外语,具备听说读写能力。

Doctorial candidates are expected to have a deeper understanding of the future development of the research field while carrying out scientific research independently. Doctorial candidates are capable of listening, speaking, reading and writing. Master at least one foreign language is a plus.

三、 培养目标 Objectives:

(1) 具有客观正确的科学精神和创新性精神,拥有批判性思维,能够运用所学知识和科学方法分析处理问题,并应用于科学实践中。

Doctoral students are required to have the objective attitude towards scientific research and innovation. Doctoral students are expected to apply the knowledge and scientific methods in fundamental areas and to tackle real life problems. Critical thinking skills are highly valued.

(2) 以物理学研究发展的前沿问题为主要研究方向,充分发挥研究生的主观能动性,重点培养其获得新知识以及从事原创性研究工作的能力。

Doctoral students are expected to take initiatives when doing cutting edge researches in physics or interdisciplinary fields. The Department of Physics aims at cultivating doctorial students with emphasis on the abilities of acquiring new knowledge and conducting original research.

(3) 严格遵守学术规范和学术道德,自觉抵制研究工作中急功近利、粗制滥造、损人利己等不良风气,自觉维护学术事业的纯洁性和严肃性。

The students should strictly abide by academic norms and ethics, consciously

resist unhealthy practices such as eagerness for quick success and instant benefits, shoddy production, and profit at the expense of others, and consciously maintain the purity and seriousness of academic undertakings.

(4) 具有良好的文献检索、文献分析和数据处理能力，具有快速阅读外文文献的能力，能够正确全面的理解文献要表达的科学内涵。

Doctoral candidates are required to have the data retrieval, analysis and processing skills while reading overseas research articles. They are expected to gain an accurate and comprehensive understanding of the scientific connotation within those researches.

(5) 能够通过通俗易懂的方式让大众了解所研究的科学内容并进行科普写作和演讲。

Doctoral candidates are able to write science articles, deliver lectures and promote the public understanding of their scientific research in a simple and understandable way.

(6) 掌握坚实宽广的基础理论和系统深入的专门知识，熟练掌握一门外语，能运用外语进行对话，具有独立从事科学研究工作的能力，可以独立地运用外语进行专业写作。

Doctoral students are required to be proficient in at least one foreign language; they are expected to use the language to conduct scientific research independently as well as write academic journals professionally.

四、学习方式及学习年限 Length of Study

本专业攻读博士学位的学制 3 年，博士研究生最长学习年限不超过 8 年。

The length of degree for Doctoral candidates usually takes in 3 years, the maximum length of schooling for Doctoral candidates should not exceed 8 years.

五、 研究方向 Training Direction

- 1 理论物理
- 2 光学
- 3 无线电物理
- 4 凝聚态物理

1. Theoretical Physics
2. The Optical
3. Radio Physics
4. Condensed Matter Physics

六、 语言要求 Language requirements

留学生需要具有中文学习交流的能力，能听懂中文课程，在听说读写方面满足毕业要求。

International students need to have the ability to learn and communicate in Chinese, understand Chinese courses, and meet the graduation requirements in listening, speaking, reading and writing.

七、 培养方式及导师要求 Training methods and Mentor requirements

培养方式为导师个人指导或导师团队指导相结合。导师需要有海外学术交流访问经历。

The training method is a combination of individual mentoring or advisor team guidance. Advisors need to have overseas academic exchange visit experience.

八、 课程设置及学分要求 Courses and Credits Requirements

(1) 已取得硕士学位继续攻读博士学位的学生需修满 22 学分，其中公共课 7 学分、本专业的专业课不低于 8 学分、创新创业课不低于 2 学分、学术规范与写作 2 学分、学术研讨课 3 学分。专业课选修不低于 2 门，第一学年须修完除

学术研讨课之外的所有其他课程。课程详细设置请查看附表。

(2) 为提高博士生的学术水平，要求在攻读期间参加物理学科主办学术报告 30 次以上。

(3) 免修条款：根据学校规定，本系留学生原则上应按照入学时培养方案规定的课程进行学习，但入学前三年内已修习过博士生培养方案中相同课程且成绩合格的研究生；或研究生因退学等学籍变动等原因中止学业后五年内重新入学时，培养方案中的课程在原单位已经修读合格并获得学分的，可以申请免修该门课程并认定学分。申请免修课程须填写《上海大学研究生课程学习免修单》并提供原考试成绩单，经导师签署意见，学院批准后报研究生院审核。研究生申请认定的课程学分不得超过培养计划课程总学分的 50%；培养方案中明确不允许校外修读的课程不予认定。

(1) Students who have obtained a master's degree and continue to study for a doctoral degree are required to have 22 credits, including 7 credits of public courses, no less than 8 credits of professional courses, no less than 2 credits of innovation and entrepreneurship courses, 2 credits of Academic Criterion and Scientific Paper Writing, and 3 credits of academic seminar courses. The students need to take no less than 2 elective professional courses.

In first year, all courses are required to be completed (except academic seminars). Please refer to the attached table for the detailed course information.

(2) Besides broad and demanding curriculums for doctoral studies, we expect students to participate in academic seminars for more than 30 times during their study period and get actively involved in research work besides their primary learning period.

(3) Waiver clause: International students in this department should, in principle, study according to the course prescribed by the training program at the time of admission, but have completed the same course and qualified graduate students who have completed the same course in the doctoral training program within three years of

admission; or if the graduate student re-enrolled within five years after the suspension of admission due to changes in academic status such as withdrawal, the course in the training program may apply for exemption from the course and be recognized. Application for exemption courses must fill out the "Shanghai University Graduate Course Study Waiver Form" and provide the original test transcript, after the tutor signed the opinion, the college approved and reported to the Graduate School for examination. The course credits for graduate students applying for recognition shall not exceed 50% of the total credit scored in the training program courses

九、 培养计划制定 Make Training Plan

攻读博士学位的研究生入学后,应在导师指导下按照本学科当年度培养方案的要求制定培养计划,根据学位要求和培养目标,制订培养计划,并在入学后1个月内登录研究生管理系统,输入培养计划。同时,打印的纸质版培养计划报学院(学科)学位分委员会审核批准后,由学院统一备案留存。

After the enrollment, doctoral candidates are expected to make their own study plans under the guidance of their academic advisors while following the requirements of the degree program. Students are expected to log into the online graduate students system and input their study plans within one month of the enrollment. Meanwhile, the printed version of their study plan will be submitted to the academic degree sub-committee of the school (discipline) for further approval, and then sent to the graduate school center.

十、 必修环节 Compulsory

(1) 课程考核。(考核时间、考核要求与结果使用)

(a) 所有课程应在入学后的三个学期内修完(学术研讨课入学后八个学期内修完),要求每门课程成绩不得低于60分。所选专业课程应至少有一门为专业基础课,专业基础课一般采用考试形式进行考核;专业选修课和文献阅读课可灵活采用考试或课程论文形式。成绩低于60分为不及格,不及格的课程必须重修或经批准后改选同类课程。课程考试及格但低于75分也可申请重修。重修通过后方可进入学位论文开题报告和中期考核环节。

(1) Course assessment. (Time, requirements and results)

(a) All courses should be completed within three semesters of admission (within eight semesters of admission of academic seminar courses), and the scores of each course should not be lower than 60 points, and the average score should be above 75 points (including). At least one of the selected professional courses should be a professional basic course. Elective courses and literature reading courses can be flexibly adopted in the form of examination or course paper. If the grade is below 60, it is considered as a failure, and the failing course must be retaken or re-selected after approval. Students who pass the course but score less than 75 points can also apply to retake the course.

(2) 学位论文开题报告与中期考核。(考核时间、考核要求与结果使用)

(a) 选题：选题应根据专业特点，着重选择对于科学研究和经济建设有应用价值的课题。课题要具有先进性，课题份量和难易程度要适当，并尽量结合国家、部委和上海市的科研任务选题。

(b) 开题条件：应修满培养计划规定的学分和递交 5000 字以上文献阅读专题报告及 2—3 篇学术讨论会小结报告并经导师同意。至少有一篇 SCI 学术论文已系统完成，方可申请开题。

(c) 开题要求：在入学一年内（博士生）或三年内（硕博连读生）开题。内容包括文献综述、选题意义、研究目标与难点、预期成果和可能的创新点等部分。引用文献不少于 40 篇。

(d) 开题评审：组织集中开题并进行评议，评议通过后方可开题。对评议不通过者给予警告，三个月后可复审一次，仍不通过者，按学籍管理有关规定给予处理。

(d.1) 实施学位论文学科集中开题制度。成立学科学位论文开题小组，负责组织本学科内研究生的学位论文集中开题工作。

(d.2) 实行导师回避制度。学科学位论文开题小组成员一般不少于 5 人，其

中校外专家不少于 2 人。

(d.3) 严格分流淘汰。对参加学位论文集中开题研究生的考核结果进行排序，并严格按照考核要求对不合格的研究生进行处理。

(e) 中期考核：在论文课题研究中期，在开题报告计划的范围内，对论文进展情况阶段性报告和中期考核，以保证论文按进度完成。中期考核需组织 7 名一级学科高级职称（至少 4 名教授）的教师听取进展报告并进行评议。对评议不通过者给予警告，半年后可复审一次，仍不通过者，按学籍管理有关规定给予处理。中期考核答辩 1 次不合格的学生进入观察名单，中期考核 2 次答辩不合格的学生进入分流淘汰名单。

(2) Thesis proposal report and mid-term assessment. (Time, requirements and results)

(a) Select topic: Select topics should be based on professional characteristics, focusing on the selection of scientific research and economic construction. The subject should be advanced, the weight and difficulty of the subject should be appropriate, and try to combine the national, ministerial and Shanghai scientific researches.

(b) Opening conditions: the credits stipulated in the training plan and the submission of 5000 words or more literature reading special reports and 2-3 colloquial summary reports and the consent of the tutor. At least one SCI academic paper has been systematically working before applying for an opening.

(c) Opening requirements: within one year of admission (phD) or three years (Master-PhD crossover students) open the question. The content includes literature review, the significance of selected topics, research objectives and difficulties, expected results and possible innovation points. No less than 40 citations. Graduate students who fail to complete the proposal within the normal length of study will be given warning, delay or triage and elimination.

(d) Opening review: A committee will be organized before the opening of the topic. A warning shall be given to those who fail the review, and may be reviewed once after three months, and those who fail to pass it shall be dealt with in accordance with the relevant provisions of the administration of academic registration.

(d.1) A subject thesis opening group should be set up.

(d.2) The group should have more than 5 members in the absence of the PhD's advisor. The member from outside SHU should be at least 2.

(d.3) The examination results of graduate students participating in the degree examination papers shall be sorted centrally, and the unqualified graduate students shall be dealt with in strict accordance with the examination requirements.

(e) For those who fail to pass the evaluation, the subject group shall uniformly organize the re-evaluation within three months. Students who fail to meet the requirements of each required part will be given academic warning, postponement, diverting elimination or elimination. The policy should be implemented according to the related rules of the Department of Physics.

(3) 国际学术交流 International Academic Exchanges

博士生需答辩前，在国际学术交流方面达到以下条件之一：

(a) 参加一次学科认定的高水平国际会议；

(b) 有三个月以上的境外交流经历；

(c) 参加学科举办的国际性的 workshop；

(d) 通过了学科引进的全英文课程。

Doctoral students should meet one of the following conditions in international academic exchanges before the defense:

(a) Participate in a high-level discipline-recognized international conference;

(b) More than three months of overseas exchange experience;

(c) Participate in the international workshop held by the discipline;

(d) Pass the whole English course introduced in the subject.

(4) 学位论文答辩。(考核时间、考核要求与结果使用)

(a) 前提条件：每位博士生在规定的学习年限内修完教学计划规定的内容，完成课程学习和必修环节，成绩合格者，在完成学位论文并经导师认可，可进行预答辩。

(a.1) 实施集中预答辩制度。成立学科学位论文预答辩委员会，负责组织本学科内研究生的学位论文集中预答辩工作。

(a.2) 实行导师回避制度。学科学位论文预答辩委员会成员一般不少于 5 人，其中校外专家不少于 2 人。

(a.3) 严格分流淘汰。对参加学位论文集中预答辩研究生的考核结果进行排序，并严格按照考核要求对不合格的研究生进行处理。

(b) 预答辩通过后论文送盲审，双盲通过后，可由校内外同行专家进行评审、答辩。对不合格者可由学校或院学位委员会做出不授予学位或延期补充论文重新进行答辩的处理。

(c) 通信评审和答辩：发送 3 名正高级职称专家进行评议，其中必须有外单位专家。经同行专家评议后，若 2 名专家评阅人均不同意答辩，此次申请无效，申请人需修改论文后重新申请。若 1 名专家评阅人不同意答辩，经导师与学院同意后聘请 1 名专家评阅人，若再聘专家评阅人同意答辩后，则同行专家评议通过；如再聘评阅人不同意答辩，则此次申请无效；全部专家同意答辩后，按专家意见修改论文，组织答辩。

(d) 答辩委员会由 5（或 7）名正高职称专家组成，其中校外专家须超过半数，论文评阅人要小于半数。

(3) Defense of dissertation. (Time, requirements and results)

(a) Prerequisites: each PhD candidate within the period of study who has completed the courses and compulsory parts, upon completion of the dissertation and approved by mentor, after defense and double blind can be conducted by face-to-face peer expert review. Graduation certificates will be issued to those who pass the defense. Those who meet the requirements of degree conferment stipulated in the detailed rules for the implementation of degree conferment of Shanghai University may apply for the corresponding doctoral degree.

(a.1) A pre-defense committee with at least 5 experts in the absence of the PhD's advisor. The member from outside SHU should be at least 2.

(a.2) There must be two experts from institute other than Shanghai University.

(a.3) The pre-defense results of graduate students shall be sorted centrally, and the unqualified graduate students shall be dealt with in strict accordance with the pre-defense requirements.

(b) After the students pass the pre-defense reviewing, the dissertation shall be subject to "double-blind" evaluation in accordance with the regulations of the academic degree office of the university. For those who fail to pass the examination, the university or school academic degree committee may decide not to grant the degree or postpone the defense of the supplementary dissertation.

(c) Review Communication and Defense: 3 experts with professional titles or above shall be sent for evaluation, among which there must be experts from institute other than Shanghai University. After the peer-review, if neither of the two reviewers agrees with the defense, the application shall be invalid, and the applicant shall revise the paper and apply again. If one expert reviewer does not agree with the defense, one

expert reviewer can be hired upon the approval of the tutor and the college. If another reviewer agrees with the defense, peer expert review will be passed. If the reviewer does not agree with the defense, the application will be invalid. After all the experts agree to the defense, modify the paper according to the expert's opinions and organize the defense.

(d) During the study period, the graduate students shall meet the quantitative indexes of scientific research achievements stipulated by the discipline; otherwise, the university or the academic degree committee of the school may postpone the granting of degrees.

(e) Defense of dissertation: The committee should consist of 5 (or 7) experts with full professor titles, among which there must be 3 (or 4) experts from institute other than Shanghai University. The peer-review member should be less than half of the committee.

十一、学位论文 Paper Work

本专业的博士生的科学研究工作应在导师的指导下进行，指导老师有责任和义务为所指导的研究生提供必要的科学研究的条件、设施和经费。学位论文的基本要求：

The scientific research of doctoral students of this major should be conducted under the guidance of the supervisor, who has the responsibility and obligation to provide the necessary conditions, facilities and funds for the scientific research of the graduate students. The following are some of the basic requirements of the dissertation:

- (1) 论文选题应有一定的理论意义或应用价值，具有一定的发展前景。
- (2) 论文内容应体现出作者的知识水平及对系统的专门知识的掌握情况。
- (3) 论文的结果应有一定的创新性。

(4) 论文的研究方法应体现出科学性。

(5) 论文应格式正确、语句通顺、图表清晰、引文准确规范。

(1) The topic reflects theoretical value or application value, and has certain prospects for development.

(2) The content fully demonstrates the author has a solid and broad theoretical foundation and systematic knowledge in physics.

(3) The research theme is clear, the structure is reasonable, the conclusion is distinct, and the logic of analysis and demonstration is rigorous. The results of the paper should contain some innovative findings.

(4) The research method should reflect the methodology of science.

(5) The format of dissertation must be standardized: titles should be concise and focused; Expression of the main body must be fluent, avoid using literary or emotional non-academic words, and typesetting should be neat and standardized; Charts and formulas are standardized; References are complete and standardized.

本专业的博士毕业生在答辩前必须达到上海大学物理学科研究生申请学位创新成果要求。

Before (Dissertation) oral defense, doctoral candidates must meet the scientific research and innovation achievements of Shanghai University.

附表. 课程设置与必修环节

学术学位博士研究生（留学生）课程设置与必修环节

类别 Course Category	课程编号	课程名称 Course name	学时 class hour	学分 Cred its	开课 学期 Term	备注 Remark
公共课 Public Courses	0LY000001	中国概况 General Situation of China	60	3	3	必修 Compulsory
	0LY000002	综合汉语 B Comprehensive Chinese B	60	3	2	
	0CS000027	公共体育 Public Physical Education	20	1	1	
专业课 professional courses	2XBL01202	量子材料物理 (Physics of Quantum Materials)	40	4	3	至少 2 门 At least 2
	2XBL01203	高等量子力学 (II) (Advanced Quantum Mechanics II)	40	4	2	
	2XB012015	量子多体理论 (Theory of Quantum Many-body Systems)	40	4	2	
	2XB012014	凝聚态光谱学 (Optical Spectroscopy on Condensed Matter Systems)	40	4	3	
	2XBL01208	高等电磁场理论 (Advanced Electromagnetism Theory)	40	4	3	
	2XBL01207	软分子系统建模 (Modeling of Soft Molecular Systems)	40	4	2	

	2XBL01206	线性代数与量子信息 (Linear algebra and quantum information)	40	4	1	
学术规范与写作课 Academic Standards and Writing Course	4XB012001	物理实践与创新 (Innovation Courses in School in Physics)	20	2	2	必修 Compulsory
创新创业课 Innovation and Entrepreneurship Course	7XBL01201	物理学学术规范与写作 (Academic Criterion and Scientific Paper Writing)	20	2	3	必修 Compulsory
学术研讨课 Academic Seminar Course	6CB000001	学术研讨课 (Academic Seminars)	60	3		必修 Compulsory
跨院系、专业选修课 Cross-Disciplinary Optional Courses	学生可根据自身情况在导师指导下跨院系、专业选取非本专业课程列入培养计划，课程学分计入总学分。 Under the guidance of supervisors, students can select cross-disciplinary optional courses as part of their program. The course scores will be incorporated into the total academic score.					
补修课 Designated Complementary Courses	根据学生具体情况由导师指定选修硕士生/本科生主干课 2-3 门 (不计入总学分) Students are required to select two to three undergraduate courses designated by the supervisors, which will not be incorporated into the total academic score.					
必修环节 Required Steps	课程考核 Course Scores				4	须通过考核后方可进入下一环节 Move to the next step only after confirming the previous step
	论文开题与中期考核 Thesis Proposal and Mid-Term Evaluation				5/7	
	论文预答辩 Thesis Pre-Defense				11	
	论文答辩 Thesis Final Defense				11	