

## 课程大纲 COURSE SYLLABUS

1.	<b>课程代码/名称 Course Code/Title</b>	PHY5034/现代物理实验 Experiments in Modern Physics A
2.	<b>课程性质 Compulsory/Elective</b>	专业核心课 Degree Compulsory Course
3.	<b>课程学分/学时 Course Credit/Hours</b>	3/64
4.	<b>授课语言 Teaching Language</b>	中文 Chinese
5.	<b>授课教师 Instructor(s)</b>	朱金龙 Jinlong Zhu
6.	<b>是否面向本科生开放 Open to undergraduates or not</b>	否 NO
7.	<b>先修要求 Pre-requisites</b>	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.) 无 N/A
8.	<b>教学目标 Course Objectives</b>	<p>(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>随着实验技术的高速发展, 温度、磁场、压力等热力学维度不断拓宽, 大科学装置和仪器设备使实验的精度和弱信号的探测为现代实验物理提供了强有力的支撑。本课程旨在给研究生介绍现代物理实验设备的物理原理和实验应用, 并在此基础上开拓他们的批判思维和定量推理能力, 加强对物理问题的创新和批判能力。实验技能的介绍和培训能直接培养研究生在物理学方向的研究兴趣, 有助于其未来在物理领域的发展。</p> <p>Benefiting from the high-speed developing of modern scientific instruments, such as the extreme boundary pushing of temperature, magnetic field and high pressure, the new generation of large facilities, the accuracy and weak signal detecting capabilities of advanced technics, a new opportunity for modern physics is open. The goal of this course is to provide the graduate student with a broad and fundamental understanding of the scientific instruments' principles of modern physics experiments, to help them develop creative thinking and quantitative reasoning capabilities, to empower graduate students with critical thinking about physics problems and experiments, and to provide experimental training for students planning careers in physics and in physical sciences broadly defined, including those whose interests lie in research.</p>
9.	<b>教学方法 Teaching Methods</b>	<p>(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>本课程以课堂教学为主, 开设具体实验为辅。</p> <p>This course is mainly lecture-based, including corresponding lab visits.</p>
10.	<b>教学内容 Course Contents</b>	

(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)	
<b>Section 1</b>	<p>本课程将会涉及以下内容: 实验仪器 (SEM, TEM, AFM, STM, Raman, ARPES, LEED, NMR) 的原理和表征方法; 大型同步辐射及中子散射技术; 高压技术; 热电材料制备和测量技术; 低温强磁场下材料的物理性质与测试技术; 薄膜材料制备与性能测试; 激光技术及光与物质相互作用等等 (具体讲解内容根据不同授课老师涵盖内容不同)。</p> <p>The course will cover the following topics: instruments used in condensed matter physics, such as SEM, TEM, AFM, STM, Raman, ARPES, LEED, NMR etc.; Synchrotron and Neutron based diffraction and scattering; high pressure technics; thermoelectric materials and measurement techniques, physical properties and experimental techniques at low temperature and high magnetic field, fabrication and characterization of thin films, laser techniques and optical properties of condensed matters, etc (course contents based on selected professors).</p>
<b>Section 2</b>	<p>在每次授课内容之后: 会有相应的实验仪器参观, 或视频原理讲解, 简单实验技术应用等方式进一步促进对所学技术和原理的应用。</p> <p>After each specific technical content, there will be a lab tutorial course, or video demonstration or hands on experiments, in the purpose of deeper understanding technics and their applications</p>
<b>11. 课程考核</b> <b>Course Assessment</b>	
<p>(① 考核形式 Form of examination; ②. 分数构成 grading policy; ③ 如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>平时出席占 20%, 平时作业占 30%, 研究项目占 50%。</p> <p>Attendance: 20%, Assignments: 30%, Final project: 50%.</p>	
<b>12. 教材及其它参考资料</b> <b>Textbook and Supplementary Readings</b>	
无。 N/A	