

实验谱学

Experimental Spectroscopy

The lecture is offered for graduated students, who are interested in spectroscopy of plasma. The experts in this field will provide knowledge of diagnostic of fusion plasma such as the ones in LHD in Japan and EAST in China using particular spectrometers and technologies, together with fundamental knowledge of general spectroscopy respect to many modern physics large experiment, such as electron ion beam trap and storage ring, etc.

The professors involved in the lecturers are of the first frontiers of experimental spectroscopy. Their full coverage of knowledge of spectroscopic diagnostic of plasma and deeply understanding of the principle and application of this discipline will help the graduated students quickly get into the field and be equipped with basics skills of experimental spectroscopy. They will also be guide to try to analysis problems of application of spectroscopy and build a systematic logical approach in dueling with complex situations in spectroscopic plasma diagnostic.

教师风采



邹亚明：复旦大学现代物理研究所所长，教授，国家“杰出青年基金”获得者。长期从事原子结构、原子光谱和原子碰撞以及高电荷态离子相关物理研究，主持成功研制了中国第一台、国际第八台冷电子束离子阱装置（EBIT），以及国际低能极限第一的超低能 EBIT；已发表学术论文 120 余篇，国际光子、电子和原子碰撞会议国际委员会委员、国际常务委员会委员。长期给本科生和研究生讲授《聚变等离子体物理》、《高电荷物理》等课程。



Kitsuru Kikuchi (菊池 満)

Chairman, AAPPS-DPP, Chairman, Reviews of Modern Plasma Physics
Supreme Researcher, Fusion research and development directorate, Japan Atomic Energy Agency
Guest Professor, Osaka University
Visiting Professor, Southwestern Institute of Physics, China
Chairman of IAEA's Nuclear Fusion Board of Editor, Fellow, Institute of Physics



Shigeru Morita

He worked in TEXT tokamak at University of TEXAS in USA, ATF stellarator at ORNL in USA and W7-AS stellarator at IPP-Garching in Germany on impurity pellet injection, Zeff measurement and H-mode study, respectively.
After back to Japan, he joined LHD project at National Institute for Fusion Research (NIFS) and began the construction of several instruments on visible, VUV, EUV and X-ray spectroscopy in addition to impurity pellet injector.
He have supervised many PhD students on core & edge impurity transports, confinement improvement, instrumental development and atomic physics in LHD during past 20 years, and published more 50 papers on top magazines in this filed.



Kerry Lawson

He worked for CCFE since 1989 primarily involved with the JET European Tokamak project. His research on JET has involved the extensive use of VUV, XUV and soft X-ray spectroscopy to characterize the plasma fuel and its impurities in order to gain a greater understanding of their behaviour. This has included the identification of the impurities, quantifying their concentrations and elemental components of radiated powers, together with analyses of core and edge transport. As a leading expert of Tokamak spectroscopy, he has published more than hundred important papers about diagnostic of carbon ions in JET



杨洋：复旦大学现代物理研究所副教授。从博士阶段开始从事等离子体精密光谱诊断工作，留校工作后，继续从事谱学相关的科研工作，5年内发表SCI论文近10余篇，获得自然科学基金项目2项，并自主研制了多套高精度谱仪系统。并为中科院近物所研制了适合其使用的高精度X射线谱仪，其发明的特殊弱光谱复原算法被“神光”大科学装置研究组采用并对其光谱研究产生巨大推动作用。自2015年开始开设本科生实验谱学课程，通过引入最新的谱学发展和应用，大大拓宽了该课程的基础，开阔了学生的眼界和思路

课程设置

学分：2 学分

学时：36 学时

基础知识要求：选课学生具备基本的物理知识。

上课时间：2018年10月8日 - 23日

课程助教：李梅春，学号：14110200003，

邮箱地址：14110200003@fudan.edu.cn，

手机号：18516349070

选课网址：

<http://register.fudan.edu.cn/p/publish/show.html?queryType=set&searchName=paidInfo.search&projectId=61938>

课程进度安排：2018年10月8日至10月23日				
日期	星期	节次	上课内容	授课教师
10.8	一	6-8	Preface and introduction to spectroscopy	邹亚明教授

10.9	二	11-13	Fundamentals of Fusion	Prof. Kikuchi
10.10	三	11-13	Fusion reactors	Prof. Kikuchi
10.11	四	11-13	Diagnostic to fusion plasma (general)	Prof. Kikuchi
10.14	日	6-8	Introduction to tokamak and Stellarator spectroscopy	Prof. Morita
10.14	日	11-13	Frontiers topic of problems of modern spectroscopy of fusion	Prof. Morita
10.15	一	11-13	Introduction to spectroscopy in LHD and EAST	Prof. Morita
10.16	二	11-13	Introduction to JET tokamak	Prof. Lawson
10.18	四	11-13	Frontiers topic of spectroscopic diagnostic in JET	Prof. Lawson
10.21	日	11-13	New problems in the spectroscopy to plasma	Prof. Lawson
10.22	一	11-13	Introduction to EBIT spectroscopy and other important light sources	杨洋副教授
10.23	二	11-13	答疑和考核	杨洋副教授等

参考教材:

Spectrophysics: principles and applications, by A. Thorne, U. Litzen and S. Johnsson, 1999, Springer-Verlag

Handbook for highly charged ion spectroscopic research, by Y. Zou and R. Hutton, 2011, CRC Press