

Phys 245

近代物理導論

Introduction to Modern Physics

Wed 7, 8, 9

15:40 - 16:30

16:40 - 17:30

17:40 - 18:30

閻愛德

Office 714

Tel. 574-2521 (O) 571-2832 (H)

e-mail edyen@phys.nthu.edu.tw

物 019

助教: 郭彥廷 李融宗

Recitation 7 - 9 pm (19-21)

Session 1/2 Monday / Tuesday

Textbook

"Physics for Scientists and Engineers with Modern Physics" Third Edition

by

Fishbane, Gasiorowicz Thorton

Chapters 1-39 have been covered.

Chapters 40-45 will be covered this semester

Comments on the book

through

its preface

Emphasis:

Doing things correctly

Conceptual emphasis

Modern physics integrated.

Mathematics

Self-contained

Appears in progressive degree of difficulty.

Versions of the text

Extended (with Modern Physics) Chapters 1-45

Standard Chapters 1-40

3 volume softcover volumes.

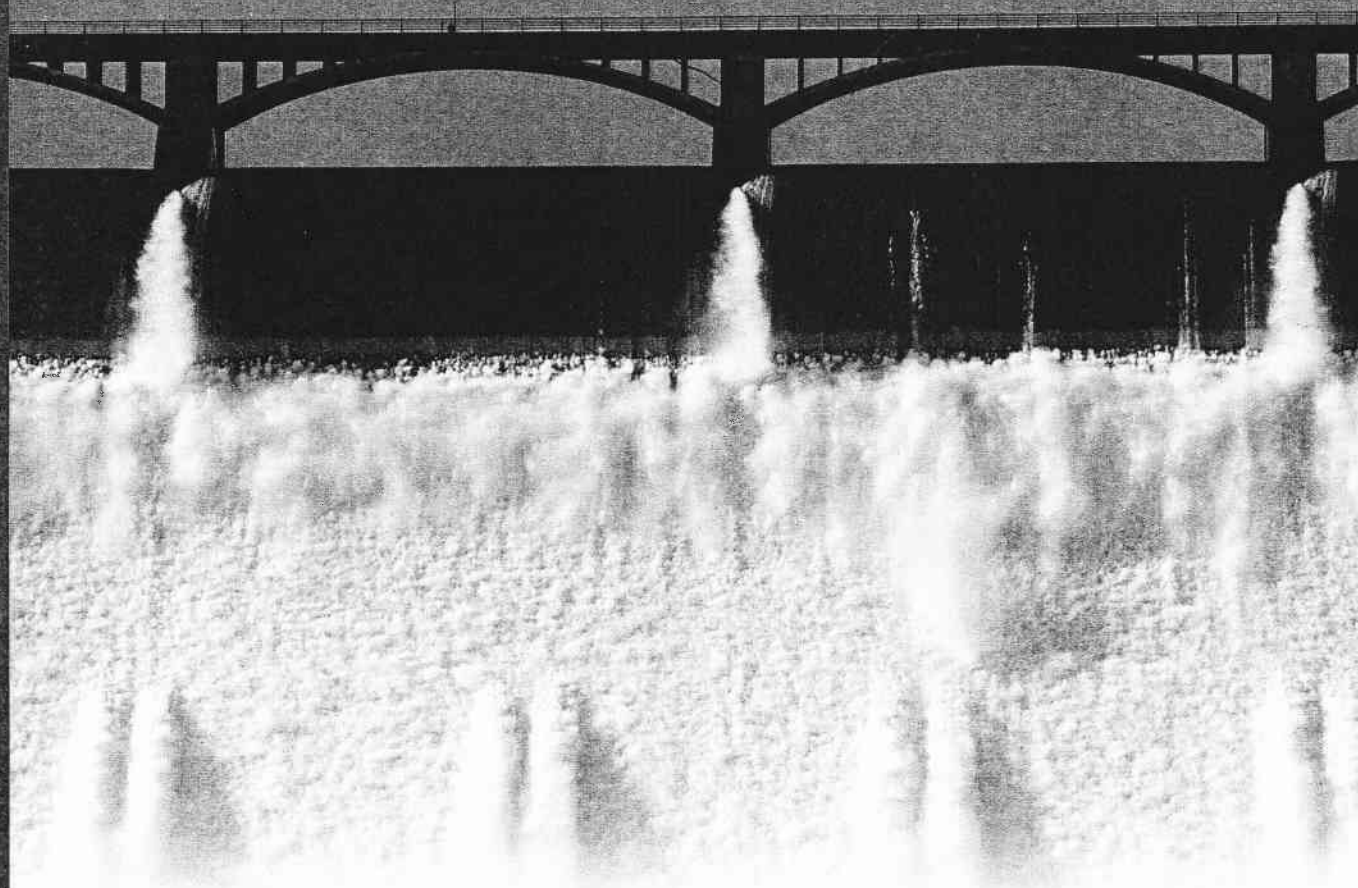
volume I (Chapters 1-20), volume II (Chapters 21-38), and volume III (Chapters 39-45)

INTERNATIONAL EDITION

PHYSICS

for Scientists and Engineers
with Modern Physics

THIRD EDITION



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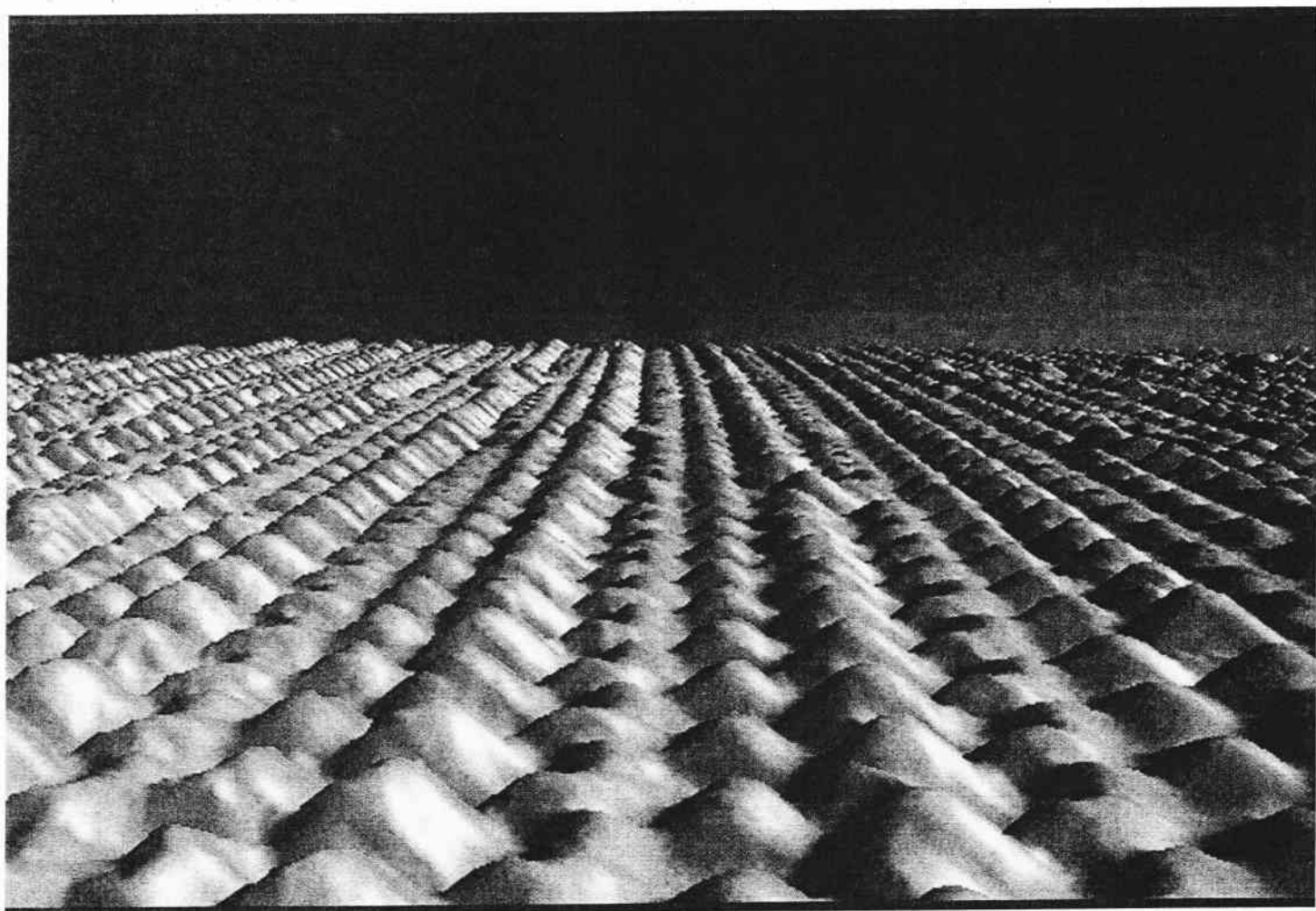
台北縣新店市寶橋路二三五巷一一八號五樓

電話: 02-8912-1188 傳真: 02-8912-1166

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MODERN PHYSICS



JEREMY BERNSTEIN

PAUL M. FISHBANE

STEPHEN GASIOROWICZ

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除了頭尾外，這兩本書基本上雷同。

本課將按改編版以原則上一星期一章的速度
至第十四章後加上英文版的第十七章及第
十八章

第十七章 *General Relativity*. (廣義相對論)

第十八章 *Cosmology* (宇宙論)

最後兩章將請邵錦昌教授代授

內容簡介

本書是Jeremy Bernstein等編著的Modern Physics (Pearson出版集團，2000年出版)的改編版。本書的原本內容豐富，資料翔實，涉及物理學領域的最新成果和研究課題，在國外被許多院校指定或推薦給學生作為近代物理學的主要參考書，具有比較大的影響。本書根據國內教學實際，刪去了原版第一篇“狹義相對論”部分，保留了“量子力學”、“物理應用”和“物理前沿”的大部分內容。本書詳細闡述了量子力學發展的歷程和取得的成就，涉及複雜原子與分子、統計物理、原子輻射與激光、導體、半導體與超導體、原子核等內容以及基本粒子物理等一些前沿領域。

本書可供普通高等學校理科物理类专业作為雙語教學教材使用，也可供其他專業和社會讀者參考。

出版者的话

为适应当前我国高等学校各类创新人才培养的需要，大力推进教育部倡导的双语教学，配合教育部实施的“高等学校教学质量与教学改革工程”和“精品课程”建设的需要，国内一些出版社都陆续原版引进了不少海外优秀教材。海外优秀教材的立体化配套、多种教学资源的整合，以及为课程提供的整体教学解决方案，都有不少值得我们学习借鉴之处。但一个不容忽视的问题是，外文原版教材与我国现行的课程内容、教学体系、教学习惯等存在着巨大的差异性。譬如，重点课程的原版教材通常很厚，内容很多，容量是国内自编教材的好几倍。国外的情况是，老师未必会都讲，剩下大量的内容留给学生自学；而国内的情况不尽相同。受国内教学学时所限，完全照搬是不合时宜的。教材的国际化必须与本民族的文化教育传统相融合，在原有的基础上吸收国外优秀教材的长处，这使得我们需要对外文原版教材进行适当的改编。改编不是简单地使内容减少，而是结合国内教学特点，引进国外先进的教学模式及思想，在教学内容和方式上更中国化，使之更符合国内的课程设置及教学环境。

2004年伊始，高等教育出版社有计划、大规模地开展了海外优秀理科系列教材的引进及改编工作。在引进改编海外优秀教材的过程中，我们坚持了两条原则：(1)精选版本，打造精品系列；(2)慎选改编者，保证品质。

首先，我们和Pearson Education, John Wiley & Sons, McGraw-Hill以及Thomson Learning等国外出版公司进行了广泛接触，经推荐并在国内专家的协助下，提交引进版权总数200余种，学科专业领域涉及数学、物理、化学化工、地理、环境等。收到样书后，我们聘请了国内高校一线教师、专家学者参与这些原版教材的评介工作，从中遴选出了一批优秀教材进行改编，并组织出版。这批教材普遍具有以下特点：(1)基本上是近几年出版的，在国际上被广泛使用，在同类教材中具有相当的权威性；(2)高版次，历经多年教学实践检验，内容翔实准确，反映时代要求；(3)各种教学资源配套整齐，为师生提供了极大的便利；(4)插图精美，丰富，图文并茂，与正文相辅相成；(5)语言简练，流畅，可读性强，比较适合非英语国家的学生阅读。

其次，慎选改编者。原版教材确定后，随之碰到的问题是寻找合适的改编者。要改编一本教材，必须要从头到尾吃透它，有这样的精力自编一本教材都绰绰有余了。我们与国内众多高等院校的专家学者进行了广泛的接触和细致的协商，几经酝酿，最终确定下来改编者。大多数改编者都是有国外留学背景的中青年学者，他们既有相当高的学术水平，又热爱教学，长期工作在教学第一线。他们了解引进版教材的知识结构、表达方式和写作方法，最重要的是他们有时间，有精力，有热情，有的甚至付出了比写一本新教材更多的劳动。我们向他们表示最真诚的敬意。

在努力降低引进教材售价方面，高等教育出版社做了大量和细致的工作，这套引进改编的教材体现了一定的权威性、系统性、先进性和经济性等特点。

First Middle Term Examination
Chapter 1-6

Second Middle Term Examination
Chapter 7-12

Final Examination
Chapter 13-14

+

Chapter 15 General Relativity
Chapter 16 Cosmology.

Grading

2 middle term	$2 \times 25\%$
Final	25%
Homework, Recitation	25%

FROM FALLING BODIES TO RADIO WAVES

Classical Physicists and Their Discoveries

Emilio Segrè



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<i>Chapter 2</i>	The Magic Mountain: Newton 45 <i>A complex, mysterious personality. Revelations to the Cambridge student. Lucasian professor: light decomposed. The Principia and the fabric of the universe. Past the prime of his age for invention. Science abandoned: warden of the mint and the darker side.</i>
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FROM X-RAYS TO QUARKS

Modern Physicists and Their Discoveries



W. H. FREEMAN AND COMPANY New York



Emilio Segrè
UNIVERSITY OF CALIFORNIA, BERKELEY

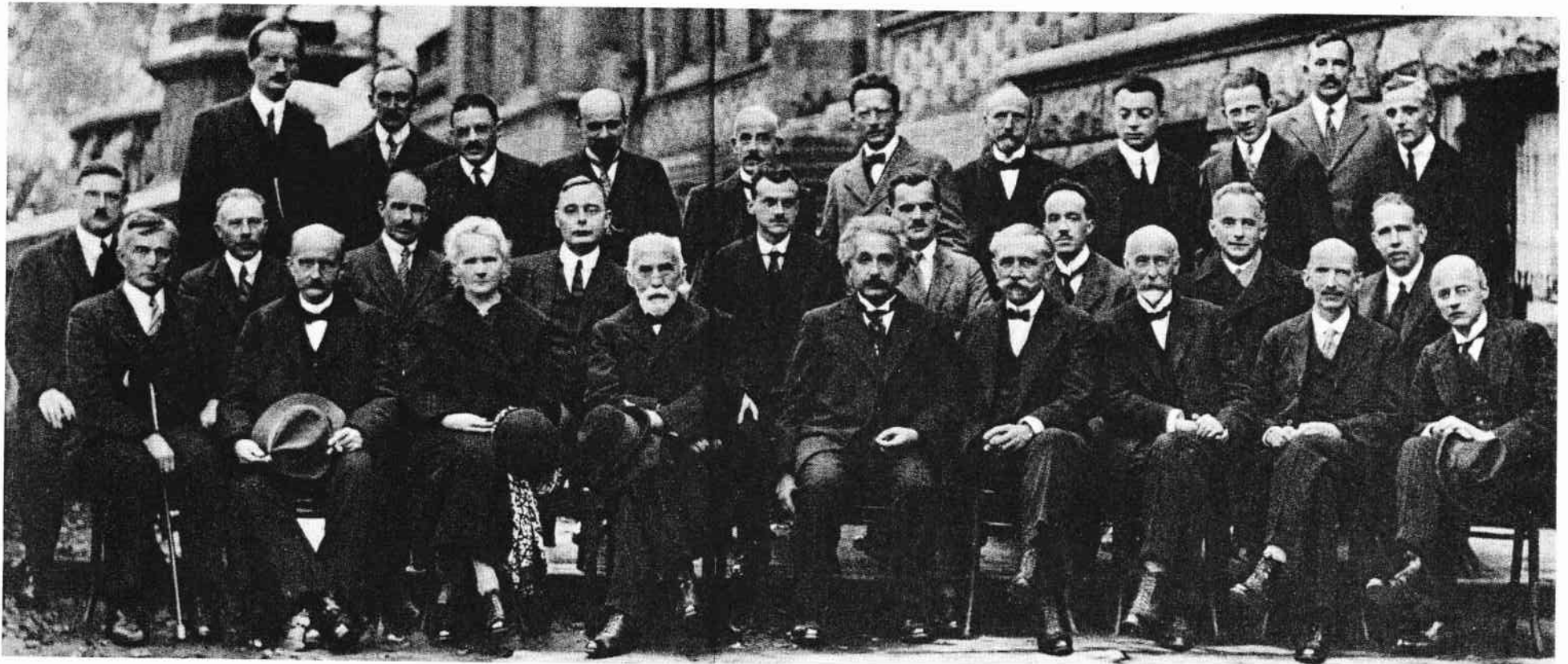


Figure 8.9 The participants in the 1927 Solvay Council. It was devoted to quantum mechanics, and the new field was, so to speak, officially inaugurated at this meeting. There were discussions between Einstein and Bohr. In the front row, left to right: I. Langmuir, M. Planck, M. Curie, H. A. Lorentz, A. Einstein, P. Langevin, C. E. Guye, C. T. R. Wilson, O. W. Richardson. Second row, left to right: P. Debye, M. Knudsen, W. L. Bragg, H. A. Kramers, P. A. M. Dirac, A. H. Compton, L. V. de Broglie, M. Born, N. Bohr. Standing, left to right: A. Piccard, E. Henriot, P. Ehrenfest, E. Herzen, T. De Donder, E. Schrödinger, E. Verschaffelt, W. Pauli, W. Heisenberg, R. H. Fowler, L. Brillouin. (Institut Solvay.)

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Preface

This book is based on lectures I gave at the University of California, Berkeley, at the University of Chicago, and at the Accademia Nazionale dei Lincei in Rome. The many flattering requests I received from audiences expressing a wish to see the lectures printed persuaded me to collect them and offer them for publication.

The lectures were addressed to people who are curious about the physicist's world, and I attempted to describe it as I would to a close friend in another field. In other words, I tried to show not only the main discoveries but also the way they were reached, the personalities of the leading physicists, and the errors committed before the right path was found. The human side and the succession of events are often full of drama.

Experience has also shown me that many young scientists wish to know more about the personalities of important scientists rather than just names attached to some discovery, and I hope that this book may at least partly satisfy such legitimate curiosity.

The book does not pretend in any way to be a history of modern physics and even less to be a small physics text. It is, rather, an impressionistic view of the events as they appeared to me during my scientific career, which started about 1927. Naturally they cannot be treated out of context, and for this reason the story begins earlier. The choice of persons and subjects treated is thus subjective, limited, and colored by my personal experience.

I am indebted to the late Mrs. Laura Fermi, Professor J. Heilbron, and several of my contemporaries and colleagues for criticism and suggestions. I thank Professor F. Rasetti, l'Institut Solvay, CERN, California Institute of Technology, Lawrence Berkeley Laboratory, and others for illustrations.

January 1980

Emilio Segrè