新编研究生英语系列教程

博士研究生英语综合教程

（第二版）

北京市研究生英语教学研究会
主编　陈大明　徐汝舟

中国人民大学出版社

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中国人民大学出版社

图书在版编目（CIP）数据

博士研究生英语综合教程/陈大明，徐汝舟主编. —2版.
北京：中国人民大学出版社，2007
（新编研究生英语系列教程）
ISBN 978-7-300-03046-3

Ⅰ. 博…
Ⅱ. ①陈…②徐…
Ⅲ. 英语-研究生-教材
Ⅳ. H31

中国版本图书馆CIP数据核字（2007）第047582号

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出版发行	中国人民大学出版社		
社　址	北京中关村大街31号	**邮政编码**	100080
电　话	010—62511242（总编室）		010—62511398（质管部）
	010—82501766（邮购部）		010—62514148（门市部）
	010—62515195（发行公司）		010—62515275（盗版举报）
网　址	http://www.crup.com.cn		
	http://www.ttrnet.com（人大教研网）		
经　销	新华书店		
印　刷	河北秦皇岛文苑印刷有限公司		
规　格	185 mm × 260 mm　16开本	**版　次**	2000年9月第1版
			2007年4月第2版
印　张	38.5	**印　次**	2007年4月第1次印刷
字　数	952 000	**定　价**	69.00元

第二版前言

学习英语，多读能丰富知识，多译能传播知识，多写则能重构和创造知识。博士生大多从事前沿性研究，他们应该学会娴熟地使用英语以便拓宽自己的视野，传播科技、文化、经济等学科精华并与世界学术精英们进行直接交流和对话。为此，我们对本教材的第一版进行了更新和修订，增删了三分之一强的课文，包括新增的“管理”和“法律”两个单元，修改了写作部分，并新增了翻译部分，教材因此更名为《博士研究生英语综合教程》（第二版）。课文的练习答案和翻译等也做了相应的调整。**本着为读者着想和节约成本的考虑，我们不再印发纸质教参，而把练习答案和课文翻译的内容挂在人民大学出版社的网站，使用本教材的读者们可以随时免费下载。请登录：www.crup.com.cn→外语分社（外语部）。**

在本教材修订过程中，我们仍然保持了第一版的主要特点（请参看第一版的前言）。对已有单元的课文增删，我们坚持的原则是剔除过时内容，增加更新近、更成熟或更贴近生活的文章。例如，“生命科学”单元选择的“克隆的危险”一文读起来比当年对克隆技术的一味乐观要更为冷静和理性；“科学”单元中的“标准模型停滞不前，物理学界翘首以盼”文章既讨论了物理学的一些前沿概念，同时也采用了各种写作技巧使它们读起来更大众化；写作讲解尽量简明实用、深入浅出；翻译力求精讲多练、学以致用，并为学生提供了充足的有针对性的翻译练习。

本教程第二版的编写具体分工如下：刘宁编写“科学”单元中的新课文并修订其保留的课文；来鲁宁编写“工程”单元中的新课文并修订其保留的课文；徐汝舟编写39课和40课并修订13、14和15课；王焱华编写19课和41课并修订16课和20课；邹映辉编写22课和42课并修订17课和24课；杨凤珍编写37课和38课并修订18、21和23课；张剑和郑辉编写27课，张剑修订“经济学”单元中的保留课文；郑辉编写35课；曹莉编写“法律”单元的全部课文；陈大明修订“生命科学”的保留课文。写作部分由赵宏凌修订。翻译部分由许建平编写。

徐汝舟负责审定“语言与文化”、“社会生活”和“管理”三个单元的课文和练习，王焱华协助审定。陈大明负责“科学”、“工程”、“生命科学”、“经济学”和“法律”五个单元的新课文选材，增删和审定该五个单元的所有内容、审定写作部分和翻译部分。另外，作为更正，第36课的练习是陈大明为本教材第一版设计的练习样本。许建平也通读并审定了“科学”、“工程”、“生命科学”、“经济学”和“法律”五个单元的课文翻译。陈大明负责本教程两部书（包括教参）格式的统一工作，曹莉协助了该项工作。

本教材选材精当，内容权威前沿，集思想性、知识性、学术性、可读性于一体，课后练习的设计别具心智。我们相信，集大家智慧的《博士研究生英语综合教程》（第二版）一定会更受大家的欢迎。

《博士研究生英语综合教程》在中国人民大学出版社的积极推动下得以顺利完成，我们谨在此表示衷心的感谢。

第一版前言

学习英语，读写不可分。进入高级阶段，读写的作用更加突出，尤其是博士生，对外交流的机会增加，用英语写论文已势在必行，而要写好一篇论文，就必须进行大量阅读。目前，供高级阶段使用的读写结合的教材不多，本书作为一种尝试，根据全国《非英语专业研究生英语（第一外语）教学大纲》编写，供在校博士生学习英语使用。

从策划开始，我们一直在探讨和采用一些新的做法。因此，与同类书相比，本教程具有以下几个特点：

1. 博士生必须博览。为此，我们精选了40篇文章，分为6个主题。各主题分别有6至8篇文章，内在联系紧密，辐射面宽，前沿性强，科技人文相映成趣。在具体教学过程中，教师可根据学生所学专业和兴趣选择重点讲授的课文。

2. 扩充词汇在博士生语言训练中依然重要，但更重要的是引导学生真正领会词汇的内在含义和正确使用它们。因此，除了Vocabulary练习外，我们还设计了Definition练习，有“引导”和“自做”两部分；在Mosaic练习中，设计了词语发音和重音找规律练习；Rhetoric练习帮助学生理解词汇的深层含义，掌握修辞手法，提高写作水平。

3. 博士生要学好英语必须增强语篇控制力。为了加强语篇训练，写作编排直接从Writing Skills（如 Definition，Exemplification等）开始；课文练习除传统项目外，我们还突出Mosaic中的篇章理解和Grouping等练习。Grouping是一种学生自己检查学习效果的练习，可帮助他们对课文作提纲挈领式的宏观理解，也利于Discussion练习中讨论的展开。

4. 练习编排涉及到的语言面比较广，层次清晰。同时，各课练习的选择既保证相对稳定，又不拘泥于形式。Mosaic练习设计形式多样，能够提高学生做练习的兴趣，同时培养他们的思维能力。

5. 写作练习编排侧重于简明实用，力争做到与课文呼应，如 Book Review等。另外，各节之间互为关联，从基本技巧到论文写作，贯穿始终。论文写作的过程和格式叙述清晰，并配有范文，能起到举一反三的作用。编排的具体说明请参阅第一课的To the Students。

本教程主编：陈大明、徐汝舟；副主编：刘宁、王焱华；编者：赵宏凌、邹映辉、杨凤珍、来鲁宁、柳君丽、张剑。具体分工如下：刘宁编写第一部分1至6课；来鲁宁编写第二部分7至14课；第三、第四部分徐汝舟编写15、16、17课，王焱华编写18、22、24课，邹映辉编写19、21、26课，杨凤珍编写20、23、25课；柳君丽编写第五部分27至33课，张剑编写第六部分34至40课。写作部分的编写由赵宏凌执笔完成。陈大明负责第一、第二、第五和第六部分的课文选材，审定该四个部分的所有内容和写作部分，刘宁和赵宏凌协助审定。徐汝舟审定第三和第四部分的课文和练习，王焱华协助审定。

各课Vocabulary练习中的词汇经计算机软件扫描确定，大部分是博士生阶段应掌握

的词汇或课文难点词汇，扫描统计工作由陈大明和柳君丽完成。为避免重复，对全书的Notes和Vocabulary用计算机进行了扫描、统计和增删，该项工作由刘宁完成。

虽然我们在博士生教学中试用过本书中的若干课文和练习，但因编写时间有限，缺点和错误在所难免，敬请读者批评指正。

编者

2000年5月

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SCIENCE

UNIT ONE

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Text 1

Can We Really Understand Matter?

by **Eugene Linden**

Few tasks are more daunting than standing in the path of a charging theoretical physicist who is hell-bent on getting funding for the next particle accelerator. As practitioners of the hardest of the hard sciences, physicists do little to discourage their aura of intellectual supremacy, particularly when suggesting to Congress that a grand synthesis of all the forces of nature is at hand if the Government will only cough up a few billion dollars more. But what if this confidence is misplaced? What if the barriers to knowledge are higher than many physicists like to admit?

For much of this century, scientists have known that the comfortable solidity of things begins to break down at the subatomic level. Like the Hindu veil of Maya, the palette from which nature paints atoms proves illusory when approached. From afar, this world appears neatly separated into waves and particles, but close scrutiny reveals indescribable objects that have characteristics of both.

Physicists have prospered in this quirky realm, but neither physics nor the rest of science has fully digested its implications. Inside the atom is a world of perpetual uncertainty in which particle behavior can be expressed only as a set of probabilities, and reality exists only in the eyes of the observer. Though the recognition of this uncertainty grew in part out of Albert Einstein's work, the idea bothered him immensely. "God does not play dice with the universe," he remarked.

The set of mathematical tools developed to explore the subatomic world is called quantum mechanics. The theory works amazingly well in predicting the behavior of quarks, leptons and the like, but it defies common sense, and its equations imply the existence of phenomena that seem impossible. For instance, under special circumstances, quantum theory predicts that a change in an object in one place can instantly produce a change in a related object somewhere else—even on the other side of the universe.

Over the years, this seeming paradox has been stated in various ways, but its most familiar form involves the behavior of photons, the basic units of light. When two photons are emitted by a particular light source and given a certain polarization (which can be thought of as a type of orientation), quantum theory holds that the two photons will always share that orientation. But what if an observer altered the polarization of one photon once it was in flight? In theory, that event would also instantaneously change the polarization of the other photon, even if it was light-years away. The very idea violates ordinary logic and strains the traditional laws of physics.

The two-photon puzzle was nothing more than a matter of speculation until 1964, when an Irish theoretical physicist named John Stewart Bell restated the problem as a simple mathematical proposition. A young physicist named John Clauser came upon Bell's theorem and realized that it opened the door to testing the two-photon problem in an experiment. Like Einstein, Clauser was bothered by the seemingly absurd implications of quantum mechanics. Says Clauser, now a research physicist at the University of California, Berkeley: "I had an opportunity to devise a test and see whether nature would choose quantum mechanics or reality as we know it." In his experiment, Clauser, assisted by Stuart Freedman, found a way of firing photons in opposite directions and selectively changing their polarization.

The outcome was clear: a change in one photon did alter the polarization of the other. In other words, nature chose quantum mechanics, showing that the two related photons could not be considered separate objects, but rather remained connected in some mysterious way. This experiment, argues physicist Henry Stapp of Lawrence Berkeley Laboratories, imposes new limits on what can be established about the nature of matter by proving that experiments can be influenced by events elsewhere in the universe.

Clauser's work pointed out once again that the rules of quantum mechanics do not mesh well with the laws of Newton and Einstein. But most physicists do not see the apparent disparity to be a major practical problem. Classical laws work perfectly well in explaining phenomena in the visible world—the motion of a planet or the trajectory of a curveball—and quantum theory does just as well when restricted to describing subatomic events like the flight of an electron.

Yet a small band of physicists, including Clauser and Stapp, are disturbed by their profession's priorities, believing that the anomalies of quantum theory deserve much more investigation. Instead of chasing ever smaller particles with ever larger accelerators, some of these critics assert, physics should be moving in the opposite direction. Specifically, science needs to find out whether the elusiveness of the quantum world applies to objects larger than subatomic particles.

No one worries about the relevance of quantum mechanics to the momentum of a charging elephant. But there are events on the border between the visible and the invisible in which quantum effects could conceivably come into play. Possible examples: biochemical reactions and the firing of neurons in the brain. Stapp, Clauser and others believe that a better understanding of how quantum theory applies to atoms and molecules might help in everything from artificial intelligence research to building improved gyroscopes. For now, though, this boundary area is a theoretical no-man's-land.

Certainly physicists are a lot further from understanding how the world works than some would have Congress believe.

综述

物理学家们一直在探索物质到底是什么。近代物理学的研究发现，物质是由不同层次的微粒构成的。二三百年前，人们发现物质由分子及原子组成。到十九世纪末，通过科学试验，科学家们认识到原子由原子核和核外电子组成。二十世纪初发起的量子力学又一次揭开了物理革命的新篇章，诞生了如普郎克、爱因斯坦、玻尔、德布罗意、薛定谔、海森伯等科学巨匠。量子力学对经典物理学中的一些传统法则提出了挑战，并在固态物理学、浓缩物质物理学、超导性、核物理、基本粒子物理学等领域的研究中显示出了非凡的生命力。

Notes

1. **hell-bent:** recklessly determined to do or achieve something.
2. **hard science:** any of the natural or physical sciences, in which hypotheses are rigorously tested through observation and experiment.
3. **the veil of Maya:** the disparagement of the sensory realm as mere illusion, characteristic of much Indian religion. Maya was the mother of Gautama Buddha in Hinduism.
4. **Albert Einstein** (1879—1955): German-born American physicist, formulator of the theory of relativity, winner of the Nobel Prize for Physics in 1921.
5. **quantum mechanics:** in physics, a theory based on using the concept of the quantum unit to describe the dynamic properties of subatomic particles and the interactions of matter and radiation.
6. **Isaac Newton** (1624—1727): English physicist and mathematician, author of the Principia, founder of the law of gravitation and laws of motion.
7. **artificial intelligence (AI):** the collective attributes of a computer or computer-controlled mechanical devices able to perform tasks commonly associated with human intelligence such as reasoning, generalizing, learning from experience, adapting, decision-making, etc.

EXERCISES

I. Vocabulary

Complete each of the following sentences with one of the four choices given below it.

1. Alice told the media that 10 to 12 people were ______ on driving her husband from FBI.
   A. bent B. imposed C. impressed D. restricted
2. The ______ is that a plenitude of information means that the scarce resource is attention.
   A. anomaly B. paradox C. gyroscope D. curveball
3. Since ancient times people have believed that long hair bestows power and a(n) ______ of sensuality.
   A. aura B. supremacy C. appraisal D. theorem
4. The ______ have both wavelike and particlelike properties, but in the lexicon of modern physics they are usually called particles.
   A. neurons B. leptons C. photons D. quantums
5. This theory held that the Constitution had created not a ______ union but a compact between independent states that retained their sovereignty.
   A. elusive B. illusory C. quirky D. perpetual
6. The ______ between cause and effect represents Roosevelt Magic, the craftsmanship of a man who is master of the art of politics.
   A. orientation B. disparity C. momentum D. speculation
7. He has ridden bulls in Oklahoma, played poker with Clint Eastwood and tossed ______ with Paul Newman in Las Vegas.
   A. palette B. dice C. security D. trajectory
8. The government's initial confidence that unemployment would fall, along with an expected decline in the rate of inflation, was ______.
   A. daunted B. meshed C. misplaced D. emitted

II. Definition

Fill in the blanks in the first four sentences with one of the words provided below (making some changes if necessary) and then provide a definition for the word in the remaining sentences. Base your choice or definition on the text.

priority	momentum	polarization	implication

1. ______ is something that must be done or dealt with as soon as possible before other things.
2. ______ is the quantity of motion of a moving body, measured as a product of its mass and velocity.
3. ______ is what can be drawn from something although it is not explicitly stated.
4. ______ is the process of restricting the vibrations of a transverse wave, especially light, wholly or partially to one direction.
5. A light-year is ______________________________.
6. A paradox is ______________________________.
7. An accelerator is ______________________________.

III. Mosaic

1. Mark the stress of the following words. What pronunciation rule can we generalize from them?

implication	recognition	polarization	orientation
speculation	proposition	profession	investigation
reaction	direction		

2. Circle the word which does not fit into the group.

   quark   lepton   molecule   photon   particle

3. What does the phrase "nothing more than" in the sixth paragraph mean?

   A. merely   B. not at all   C. not only   D. absolutely

4. The phrase "mesh with" in the ninth paragraph means "______."

   A. break away from   B. be in harmony with
   C. keep pace with   D. trap into

5. How would you interpret the sentence "God does not play dice with the Universe" in the third paragraph?

   A. God is the greatest opponent of the universe.
   B. Gambling is considered by God to be an evil activity.
   C. Uncertainty is the nature of the universe.
   D. Predictability is the key point of natural laws.

6. The last sentence of this article indicates that ______.

   A. physicists understand the world far better than the congressmen
   B. physicists overstate their understanding of the world to the Congress
   C. the Congress understands the world far better than the physicists
   D. physicists and the Congress have different ways of understanding the world

7. What kind of figures of speech is involved in the phrase "cough up" in the first paragraph?
A. Sarcasm. B. Anticlimax. C. Paradox. D. Metonymy.
8. What kind of figures of speech is NOT used in the sentence "Like the Hindu veil of Maya, the palette from which nature paints atoms proves illusory when approached"?
A. Oxymoron. B. Metaphor. C. Simile. D. Personification.

IV. Translation

A. *Translate the last paragraph of the text into Chinese.*
B. *Translate the following into English.*

1995年9月，位于瑞士的欧洲粒子物理学实验室成功地研制出了反物质原子，即反氢原子。这一惊人的消息传开以后，西方国家的一些热衷于研究反物质之谜的科学家们兴奋不已。在试图制造并收藏反物质作为宇宙飞船动力的同时，他们又提出了一个新的问题，认为近百年来地球上发生的许多神秘的核爆炸与反物质有关，也就是说，那些令人难以解释的大爆炸是反物质导演的恶作剧，是物质和反物质相撞时产生的"湮灭"现象。

V. Grouping

Group the words and phrases around the ideas marked A, B and C, adding your similar findings as many as possible from the text to the unfinished lists. Then fill in the blanks in each of the sentences below with the appropriate word or phrase from the idea section or the text.

A. Uncertainty:
quirky, probabilities, to play dice with, paradox, ______, ______, . . .

B. Contrast:
do not mesh well with, the apparent disparity, do just as well, ______, ______, . . .

C. Applications of quantum mechanics:
biochemical reactions, the firing of neurons in the brain, artificial intelligence, ______, ______, . . .

1. Mathematicians will long be studying this extraordinary exception to the law of random ______.
2. If sustainable development proves ______, environmentalists will be left with a huge