

博士研究生英语系列教材

ENGLISH

# 博士研究生 英语读写教程

北京市研究生英语教学研究会

主编 陈大明 徐汝舟

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# 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 and 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。

本书受北京市研究生英语教学研究会委托完成，会长罗立胜教授给予了热情的指导和支持。有关院校，特别是中国人民大学出版社为本书的出版作了大量工作，在此一并表示衷心的感谢。

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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## Text 1

# Can We Really Understand Matter ?

Eugene Linden

Few tasks are more daunting <sup>气作</sup> 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 <sup>奇幻</sup> 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

1. K. J. R.

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 <sup>2 photon</sup> 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 <sup>gyroscopes</sup> ~~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.

(From *TIME* )

## 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 19 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。20 世纪初发起的量子力学又一次揭开了物理革命的新篇章，诞生了如普朗克、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、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. colossal

D. restricted

2. \_\_\_\_\_ can expire by the billions as the brain refines its circuitry during development.  
A. Photon                      B. Lepton                      C. Neuron                      D. Quantum
3. Young Salman's religion and pale skin made him something of a complete \_\_\_\_\_ in his native city.  
A. paradox                      B. anomaly                      C. gyroscope                      D. curveball
4. The essence of soccer is more \_\_\_\_\_, although the objective of scoring one more goal than the other guys is easy to understand.  
A. perpetual                      B. illusory                      C. quirky                      D. elusive
5. 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
6. 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
7. The preferred solution is full NATO membership, an ambition that could \_\_\_\_\_ with the West's desire to find a post-cold war role for the alliance and a new world order that works.  
A. daunt                      B. misplace                      C. mesh                      D. emit
8. Since ancient times people have believed that long hair bestows power and an \_\_\_\_\_ of sensuality.  
A. aura                      B. supremacy                      C. polarization                      D. theorem

## 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 the conclusion that 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. 横波
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. some physicists understand the world far better than the Congressman  
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 use of 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, 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—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

September, 1995 Sweden's EPP L successfully work out anti- hydrogen atom. when the surprising news spread out many interests which are interested in anti- matter's riddle. were very exciting.

<sup>think a lot of secretly</sup>  
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。  
<sup>those inevitable big bang is evil is</sup>

## 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 problem: there is no big idea ready to fill the void.
3. Although stock exchanges have rules to \_\_\_\_\_ hoarding of hot issues, Wall Street firms generally interpret the guidelines to squeeze out the public.
4. Airline safety is coming under increased \_\_\_\_\_ in the midst of the holiday travel season, the most awkward time for a crisis of confidence in air travel.
5. Scientists working with \_\_\_\_\_ have a fantasy that eventually all the contents of the human brain, a life, can be gradually emptied into a brilliant, nondecaying, stainless, deathless sort of robotic personoid.

## VI. Topics for Discussion and Writing

1. What is quantum theory?
2. How can we distinguish quantum theory from its predecessors?
3. What will be the future applications of quantum theory? And why?
4. Write an essay on "The Impact of Quantum Theory on Our Life."



## To the Students

### 编者的话

It is not difficult to write, but it is certainly not easy to write well. As a Chinese non-English major Ph. D. student you are supposed to have acquired a large vocabulary, learned much about the English grammar and practiced writing ever since you started learning the language, but it does not necessarily mean that you have already acquired the competence to write well. Good writing is based not only on linguistic skills, but also on many other communicative skills such as the use of rhetorical devices. Therefore, a rather detailed discussion of writing is included in this textbook in the hope of helping you to expand your vision and grasp the gist of English writing.

We believe that the stage of writing designed for the Ph. D. students should not be focused on the use of words or sentences, though they are still important, but that of discourse, i. e., the organization of sentences, paragraphs and so on. Good writing is attributed to many factors, the most important of which are precise diction, logical organization of ideas and proper styles. In the light of this consideration, the writing project for this book is organized into five parts, i. e., writing skills, rhetoric, principles of writing, types of writing, practical writing and research paper writing. Furthermore, most of these parts are coherently interlocked to progress from the separate skills to the whole process of thesis writing. Specifically, the writing skills, the figures of speech, the writing principles, the types of writing, and some of the practical writing, such as summary and outline, all contribute to the final part of research paper writing.

As far as research paper writing is concerned, two parts are handled with care: process and format. In fact, you may find that the structure of the research paper discussed in this book is somewhat different from those with which you are familiar, because there are no fixed rules and the actual format varies in different contexts. The two sample research papers given are supposed to be only for your reference and may not be regarded as standard ones. And for the reason of space limit, the second sample is only an abridged one just to show what a doctoral dissertation looks like.

### EXERCISE

*Answer the following questions briefly.*