科技英语阅读与翻译

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EST Reading and Translation:
A Course Book

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科技英语阅读与翻译

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内容简介

本书共14个单元，每单元由Text A、Text B和翻译技巧三部分组成。Text A和Text B后，均配有课文词汇、课文注释和课文练习。课文练习部分是每篇文章的重要组成部分，该部分包括阅读理解、词汇和翻译三种形式。

本书适合非英语专业本科生、研究生使用，也可作为英语专业拓展课程类选修教材。

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前言

阅读不仅是一种获取知识的途径，更是一种读者运用心智和已有知识理解读物内容的心理活动。阅读的功能重在引发读者的联想和想象，启迪思想，开发智力，唤起创新意识，从而达到批判性阅读，提高思辨能力。正因为此，纵观我国的大学英语教学发展过程，“阅读论”本体观始终占据着重要甚至主导地位。

那么，阅读能力该如何培养？就大学英语教学而言，必须确立阅读课在大学英语课程体系中的核心地位。对于不同类型、不同层次的高校，可以根据具体情况制定不同的阅读课程授课计划，切忌所有高校采用“千人一面”的教学方法和教学内容。换言之，每所高校可根据各自的学科特点设置不同的阅读课程，并采用不同的阅读教材。又因为很多高校加入了教育部实施的“卓越工程师教育培养计划”，这就更加要求各高校建立更为完备的大学英语课程体系。基于这种考虑，我们精心设计并编写了《科技英语阅读与翻译》教材。本教材紧扣《教学要求》的指导精神，结合当前理工科院校非英语专业大学英语教学的需求，凸显了“厚基础、强能力、重实践”的人才培养理念，突出培养学生的科学精神、创造性思维和创新能力。

本教材结构

本教材共14个单元，每单元由Text A、Text B和翻译技巧三部分组成。Text A和Text B后，均配有课文词汇、课文注释和课文练习。课文词汇部分精选了课文中重点、难点词汇，给出了其在文中的释义，帮助读者更好地阅读和理解课文。课文注释部分根据课文中有关重点、难点之处，给出了文章产生的背景，帮助读者对文章产生的背景、文化有个大致了解，提高他们理解文章的能力。课文练习部分是每篇文章的重要组成部分，该部分包括阅读理解、词汇和翻译三种练习形式。阅读理解练习在考查读者对文章宏观理解的同时，也考查了读者对细节内容的把握；词汇练习既考查了读者对词汇同义词、形近词的甄别能力，也考查了读者对词性/形的变换能力，同时还考查了读者借助篇章进行选词的能力；翻译练习考查了读者对科技翻译的实践能力。翻译技巧部分，主要讲述了科技翻译中翻译标准、词、句、审美艺术等方面的基本概念和翻译技巧、方法等，目的是让读者对科技英语的特点及其翻译有个初步了解。同时，还配有相关练习，帮助读者切身体会科技翻译的美妙之处，以便增强英汉语言对比和转换能力。

本教材所设练习均附有参考答案，便于教师教学和读者自学使用。

前言

本教材特点

1 题材广泛，选材新颖

本教材共有14个单元，涉及认识宇宙、生命科学、生物工程、环境保护、化学、纳米技术、服装、计算机科学、数字技术、机器人、通信、新能源、航空航天、汽车等14个科技领域。每单元由2篇内容相关的文章组成。教材中文章均是选自近年来英语报刊、杂志或著作中的最新文章，这些文章从不同侧面反映该领域的最新发展动态。为了让读者品味原汁原味的科技美文，编者未对所选文章进行任何结构和形式上的改编，只对较长的文章进行了节选。

2 练习科学，针对性强

本教材中，编者根据课文内容精心设计了大量练习题。这些练习题，形式多样，既有主观题，又有客观题；既有阅读理解题，又有词汇和英汉翻译题，还借鉴了全国大学英语四、六级考试的出题思路，全方位地考查了读者对课文的理解情况。同时，基于课文内容，考查了一些综合知识，旨在拓宽学生的视野。

3 编排合理，实用性强

一部好的科技英语阅读教材应该考虑学习者本身的特点和与之关联的工作、社会、未来等的需求，更应该充分考虑学习者所学专业及相关学科。因此，本教材编写过程中，将科技英语阅读与科技翻译相结合，在科技英语阅读过程中系统介绍了科技英语的特点、翻译标准、审美艺术等特征，旨在让读者了解科技翻译的基本特征、翻译技巧等，达到学以致用。

本教材得以付梓出版，离不开多方面的支持和帮助。首先，要感谢上海工程技术大学的各级领导，尤其是基础教学学院的有关领导，他们将本教材列为“建设与培养高素质应用型人才相适应的基础学科基地”项目（该项目为“上海高等教育内涵建设085工程”，编号为A-3500-11-10，本教材为其子项目“科技英语阅读教材建设”的研究成果）的一部分，并在科研经费和政策上给予大力支持，使得本书得以顺利完成并出版。同时，本书也得到上海工程技术大学校基金项目“科技英语翻译理论与实践研究”（项目编号为2011X35）和上海工程技术大学教育科学研究项目“卓越工程师大学英语教学模式研究和优化方案”（项目编号为Y201221001）的资助。其次，要感谢参与本书编写的各位老师，是他们的不辞辛劳和努力付出，才使本书的质量得以保障。在整个编写过程中，各位老师精

诚协作，几易其稿，终成定稿。最后，要感谢国防工业出版社的领导和编辑，他们为本书的出版付出了辛勤的劳动。

本教材借鉴了当前一些优秀教材的编写思路和理念，具有较强的适应性和实用性，不仅适合非英语专业本科生、研究生使用，还可作为英语专业拓展课程类选修教材，或科技工作者以及英语爱好者学习之用。

本教材编写过程中，参考了国内外出版的有关报刊、杂志和书刊，也选用了其中不少材料和例句，使本书增色不少，有的在文中没有一一注明出处，在此表示感谢。

由于编者水平和经验有限，教材中的不当或谬误之处在所难免，希望读者在使用本教材的过程中将发现的问题反馈给我们，我们将及时加以改正，对此表示衷心的感谢。

编者

2012 年 10 月

上海工程技术大学

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Unit 1 Universe 认识宇宙

Text A Faster-Than-Light Neutrinos 比光还快的中微子

The **stunning** recent announcement of neutrinos apparently **exceeding** the speed of light was greeted with startled wonderment followed by widespread disbelief. Although virtually every scientist on record expects this discovery to **vanish** once more detailed analysis takes place, dozens of researchers are exploring the question whose answer could shake the foundations of physics: What if this **anomaly** is real?

Neutrinos are **ghostly** particles that only weakly interact with normal matter; trillions of neutrinos stream through our bodies every second. Last month researchers from the European OPERA (Oscillation Project with Emulsion-Racking Apparatus) collaboration reported clocking pulses of neutrinos moving at speeds that appeared to be a smidgen faster than light-speed. That might seem impossible, given the universal speed limit set by Albert Einstein's long-standing and well-tested special theory of relativity, but neutrinos have proved chock full of surprises over the years. For instance, in the late 1990s they were found to have mass after decades of thought to the contrary.

The **credibility** of the OPERA scientists who made the supposed discovery of **superluminal** neutrinos is not in doubt. "This is legitimate, professionally done science-these are not cranks," says neutrino physicist John Learned of the University of Hawaii at Manoa. Astroparticle physicist Steen Hannestad of Aarhus University in Denmark agrees that "there are no obvious problems with the experiment." Still, Hannestad adds, "on any given year, one or more such anomalies show up in experiments-this is particularly true for neutrino physics, where measurements are notoriously hard."

Virtually every physicist interviewed strongly doubts the results will hold up, including the experimenters themselves. Recent calculations also suggest that any neutrinos traveling faster than light would have **radiated** most of their energy away before reaching detectors, something the researchers did not see.

Nevertheless, if scientists really have discovered superluminal neutrinos, "it probably presents the biggest revolution to fundamental physics in about a century, and almost every physicist loves this challenge," Learned says. As such, a **multitude** of studies have already popped up to address the OPERA results, including some that suggest

new physics to explain the findings.

One explanation that a number of researchers have proposed is that the neutrinos might be traversing extra **dimensions** of reality beyond the familiar three of space and one of time. As such, they would only appear to be traveling faster than light from our perspective. This idea would keep Einstein's theory of relativity intact and help end decades of debate over whether extra dimensions actually exist.

"However, these models have other potential problems," says Hannestad, a researcher with a potential extradimensional explanation for the neutrino results. For instance, he notes, the neutrino pulses predicted to emerge from a trip through extra dimensions may differ in their attributes from the pulses the OPERA researchers actually detected.

Another notion is that neutrinos may travel faster through Earth than through empty space, with Earth essentially acting like a lens, says theoretical physicist Dmitri Semikoz of University of Paris Diderot in France. "Several checks of our proposal can be performed," he adds. "In particular, it predicts that the effect is proportional to the intensity of the neutrino wave. This can be checked experimentally by the OPERA and MINOS collaborations with data they already have." (MINOS, the Main Injector Neutrino Oscillation Search, is a competing neutrino experiment in the U. S.)

Dark energy, the mysterious force apparently driving the accelerating expansion of the universe, or dark matter, the as-yet unidentified substance making up about 85 percent of all matter in the universe, might be the explanation instead, suggests theoretical physicist Susan Gardner at the University of Kentucky in Lexington. The idea is that photons of light might interact more strongly with the dark universe than neutrinos do, such that the speed of light measured on Earth might be lower than its theoretical speed due to dark matter and dark energy found throughout the universe slowing it down. As such, neutrinos on Earth might only go faster than the highest speed of light we have so far discovered.

A challenge to Gardner's model comes from analysis of neutrinos from **supernova** SN 1987A, which strongly indicated the **ethereal** particles obey the cosmic speed limit. Perhaps, however, the light and neutrinos did not **emanate** from the explosion simultaneously, as assumed, and instead the star actually emitted faster-than-light neutrinos after it did the light. "Prior to SN 1987A theory told us that blue supergiant stars did not explode-SN 1987A came as something of a surprise," Gardner says. Perhaps this explosion behaved differently from more familiar supernovae, with its neutrino and light bursts occurring farther apart in time, and only by a fantastic **coincidence** did astronomers detect them close together.

To help settle the neutrino mystery, OPERA and MINOS will continue to make ever-more precise measurements of neutrino speeds.

"I think all we have to do is sit back and cheer our OPERA [and] MINOS col-

leagues onwards, and in two years or so we will know whether to get really excited," Learned says. "This is a great example of science in action, a great drama unfolding. It is either a fantastic discovery which seemingly cannot but have huge and as yet unknown consequences or it is a mistake. One would be a fool not to bet against the results, but yet they are not obviously wrong. Stay tuned!" (882 words)

Word Bank

- 1. stunning ***adj.*** 足以使人晕倒的,极好的
- 2. exceed ***vt.*** 超越,胜过
- 3. vanish ***vi.*** 消失
- 4. anomaly ***n.*** 不规则,异常的人或物
- 5. ghostly ***adj.*** 可怕的
- 6. credibility ***n.*** 可信性
- 7. superluminal ***adj.*** 超光速的
- 8. radiate ***vt.*** 放射 ***vi.*** 辐射 ***adj.*** 有射线的,辐射状的
- 9. multitude ***n.*** 多数,群众
- 10. dimension ***n.*** 尺寸,尺度;维(数),度(数),元
- 11. supernova ***n.*** [天]超新星
- 12. ethereal ***adj.*** 轻的;天上的,像空气的
- 13. emanate ***vi.*** 散发,发出,发源
- 14. coincidence ***n.*** 一致,相合,同时发生或同时存在(尤指偶然)的事

Notes to the Text

1. Neutrino 中微子

A neutrino is an electrically neutral, weakly interacting elementary subatomic particle with a half-integer spin, chirality and a disputed but small non-zero mass. It is able to pass through ordinary matter almost unaffected. The neutrino (meaning "small neutral one" in Italian) is denoted by the Greek letter ν (nu).

Neutrinos do not carry electric charge, which means that they are not affected by the electromagnetic forces that act on charged particles such as electrons and protons. Neutrinos are affected only by the weak sub-atomic force, of much shorter range than electromagnetism, and gravity, which is relatively weak on the subatomic scale, and are therefore able to travel great distances through matter without being affected by it.

Neutrinos are created as a result of certain types of radioactive decay, or nuclear reactions such as those that take place in the Sun, in nuclear reactors, or when cosmic

rays hit atoms. There are three types, or "flavors", of neutrinos: electron neutrinos, muon neutrinos and tau neutrinos. Each type also has a corresponding antiparticle, called an antineutrino with an opposite chirality.

Most neutrinos passing through the Earth emanate from the Sun. About 65 billion (6.5×1010) solar neutrinos per second pass through every square centimeter perpendicular to the direction of the Sun in the region of the Earth.

In September 2011, neutrinos apparently moving faster than light were detected (see OPERA neutrino anomaly). Since then the experiment has undergone extensive critique and efforts to replicate the results because confirming the results would change our understanding of the theory of relativity. In November 2011, the experiment was refined and yielded the same result.

2. Photon(光子)

In physics, a photon is an elementary particle, the quantum of light and all other forms of electromagnetic radiation, and the force carrier for the electromagnetic force. The effects of this force are easily observable at both the microscopic and macroscopic level, because the photon has no rest mass; this allows for interactions at long distances. Like all elementary particles, photons are currently best explained by quantum mechanics and will exhibit wave-particle duality, exhibiting properties of both waves and particles. For example, a single photon may be refracted by a lens or exhibit wave interference with itself, but also act as a particle giving a definite result when position is measured.

The modern concept of the photon was developed gradually by Albert Einstein to explain experimental observations that did not fit the classical wave model of light. In particular, the photon model accounted for the frequency dependence of light's energy, and explained the ability of matter and radiation to be in thermal equilibrium. It also accounted for anomalous observations, including the properties of black body radiation, that other physicists, most notably Max Planck, had sought to explain using semiclassical models, in which light is still described by Maxwell's equations, but the material objects that emit and absorb light are quantized. Although these semiclassical models contributed to the development of quantum mechanics, further experiments validated Einstein's hypothesis that light itself is quantized; the quanta of light are photons.

In the Standard Model of particle physics, photons are described as a necessary consequence of physical laws having a certain symmetry at every point in spacetime. The intrinsic properties of photons, such as charge, mass and spin, are determined by the properties of this gauge symmetry. The photon concept has led to momentous advances in experimental and theoretical physics, such as lasers, Bose-Einstein condensation, quantum field theory, and the probabilistic interpretation of quantum mechanics. It has been applied to photochemistry, high-resolution microscopy, and measurements of molecular distances. Recently, photons have been studied as elements of quantum comput-

ers and for sophisticated applications in optical communication such as quantum cryptography.

3. Theory of Relativity (相对论)

The Theory of Relativity, proposed by the Jewish physicist Albert Einstein (1879-1955) in the early part of the 20th century, is one of the most significant scientific advances of our time. Although the concept of relativity was not introduced by Einstein, his major contribution was the recognition that the speed of light in a vacuum is constant and an absolute physical boundary for motion. This does not have a major impact on a person's day-to-day life since we travel at speeds much slower than light speed. For objects travelling near light speed, however, the theory of relativity states that objects will move slower and shorten in length from the point of view of an observer on Earth. Einstein also derived the famous equation, E = mc2, which reveals the equivalence of mass and energy.

When Einstein applied his theory to gravitational fields, he derived the "curved space-time continuum" which depicts the dimensions of space and time as a two-dimensional surface where massive objects create valleys and dips in the surface. This aspect of relativity explained the phenomena of light bending around the sun, predicted black holes as well as the Cosmic Microwave Background Radiation (CMB)-a discovery rendering fundamental anomalies in the classic Steady-State hypothesis. For his work on relativity, the photoelectric effect and blackbody radiation, Einstein received the Nobel Prize in 1921.

4. OPERA 一个物理学实验项目

The OPERA (Oscillation Project with Emulsion-tRacking Apparatus) experiment has been designed to perform the most straightforward test of the phenomenon of neutrino oscillations. This experiment exploits the CNGS high-intensity and high-energy beam of muon neutrinos produced at the CERN SPS in Geneva pointing towards the LNGS underground laboratory at Gran Sasso, 730 km away in central Italy. OPERA is located in the Hall C of LNGS and it is aimed at detecting for the first time the appearance of tau-neutrinos from the transmutation (oscillation) of muon-neutrinos during their 3 millisecond travel from Geneva to Gran Sasso. In OPERA, tau-leptons resulting from the interaction of tau-neutrinos will be observed in "bricks" of photographic emulsion films interleaved with lead plates. The apparatus contains about 150,000 of such bricks for a total mass of 1,300 tons and is complemented by electronic detectors (trackers and spectrometers) and ancillary infrastructure. Its construction has been completed in spring 2008 and the experiment is currently in data taking.

5. MINOS 一个物理学实验项目

The MINOS (Main Injector Neutrino Oscillation Search) experiment is a long-baseline neutrino experiment designed to observe the phenomena of neutrino oscillations, an effect which is related to neutrino mass. MINOS uses two detectors, one located at Fer-

milab, at the source of the neutrinos, and the other located 450 miles away, in northern Minnesota, at the Soudan Underground Mine State Park in Tower-Soudan.

6. The Cosmic Speed Limit 宇宙速度极限

The Cosmic Speed Limit is another name for the Speed of Light. Lightbeams are allowed to travel at this speed, but rather unfairly no-one else is. Scientists have declared that it's not in fact possible to reach it, but they say this only because they're miffed that they aren't allowed to. After all-light travels at the Cosmic Speed Limit-so it can't be impossible.

The fact is-if you break the Cosmic Speed Limit, you will break the Laws of Phydlstics, and so you will probably be arrested. It is interesting to speculate on the beings that would arrest you-would they wear blue or red uniforms? And how would the flashing light on top of the police car work at lightspeed?

All these questions were likely to remain unanswered unless we at Strange BUT Untrue did another one of our ground-breaking (literally, usually) experiments, so we set up a catapult in the back garden and sat one of our fearless/gullible researchers atop it. After firing him and then several more researchers up into the air (they may recover, once we get around to inventing a cure for death by lots and lots of gravity) we decided that (a) we weren't going to reach the Cosmic Speed Limit without more money, (b) we didn't have any more money after the Lottery Grant ran out, and (c) throwing researchers into the air on catapults was rather fun.

So, one of the mysteries of the universe is still a mystery to us, but on the bright side we have discovered the new sport of Researcher Tossing. We play it every other Wednesday now, and the Olympic Committee assure us that they are seriously considering it for 2024. I think we can safely say the experiment was therefore a great success.

Exercises

I Comprehension Check

1. Choose the best answers from each of the following.

(1) Every scientist on record expects the discovery about neutrinos to vanish because _____.

A. it may start a war between science and politics

B. it may shake the foundations of physics

C. it will disorder the world of astronomy

D. it will destroy the Earth someday

(2) By saying "This is legitimate, professionally done science-these are not cranks," John Learned means that the discovery of superluminal neutrinos is _____.

A. credible B. uncertain C. logical D. strange

(3) The discovery of neutrinos helps end decades of debate over whether _____.

A. neutrinos are beyond reality

B. neutrinos travel faster than light

C. Einstein's theory of relativity has been proven

D. extra dimensions actually exist

(4) Some explanations are suggested to support the OPERA findings EXCEPT that _____.

A. neutrinos might be traversing extra dimensions of reality

B. neutrinos may travel faster through Earth than through empty space

C. neutrinos on Earth might only go faster than the highest speed of light we have so far discovered

D. neutrinos have been detected by eyes

(5) The recent discovery of neutrinos _____.

A. is a mistake

B. is a coincidence

C. calls for more precise measurements

D. opens a new page in physics

2. Complete the sentences with the information given in the text.

(1) Many people were surprised at the stunning recent announcement that neutrinos apparently exceed _____.

(2) Trillions of neutrinos stream through our bodies every second, weakly interacting with _____.

(3) It is believed that the OPERA scientists made the supposed discovery of _____.

(4) Some studies having already popped up to address the OPERA results suggest _____ to explain the findings.

(5) The expansion of the universe is accelerated apparently by _____.

(6) By means of ever-more _____ of neutrino speeds, OPERA and MINOS will continue to help settle the neutrino mystery.

Ⅱ Language Focus

1. Choose among the four alternatives one word or phrase that is closest in meaning to the underlined part in each statement.

(1) Dozens of researchers are exploring the question whose answer could <u>shake</u> the foundations of physics.

A. ruin B. consolidate C. defend D. maintain

(2) Trillions of neutrinos <u>stream</u> through our bodies every second.

A. come B. get C. pull D. flow

(3) Virtually every physicist interviewed strongly <u>doubts</u> the results will hold up.

A. claims B. asserts C. suspects D. disbelieves

(4) The discovery of superluminal neutrinos will probably present the biggest <u>revolution</u>

to fundamental physics in about a century.

A. solution B. change C. expectation D. protection

(5) Neutrinos would only appear to be traveling faster than light from our perspective.

A. imagination B. wish C. angle D. hope

(6) This can be checked experimentally by the OPERA and MINOS collaborations with data they already have.

A. applications B. considerations C. cooperations D. elaborations

(7) Supernova SN 1987A strongly indicated the ethereal particles obey the cosmic speed limit.

A. speculated B. duplicated C. complicated D. showed

(8) Perhaps the light and neutrinos did not emanate from the explosion simultaneously.

A. ignite B. originate C. produce D. generate

2. Complete the following sentences with the words given in the box. Change the form if necessary.

wonder	simultaneous	legitimate	radiate
interact	identify	intact	detect

(1) When we sing together we hear " _____ voices which are nevertheless also one voice. "

(2) The pool water was working _____ on her ankle and after a few more minutes she tested its strength.

(3) The home's aristocratic bones were _____ but in dire need of a makeover.

(4) The _____ superintendent, despite her dislike of publicity, was now quite a celebrated figure in the media.

(5) In order to _____ and characterize patterns in nutrient allocation, one must consider the body as different compartments.

(6) The capacitive touchscreen technology allows us to _____ with an iPhone and most other modern smartphones.

(7) The resistance forces were recognized as the _____ government of Libya.

(8) As the black holes narrow the gap, they _____ a tremendous amount of gravitional energy.

3. Select one word for each blank from the list of choices given in a word bank following the passage. You may not use any of the word in the bank more than once.

Modern physics began with a sweeping unification: in 1687 Isaac Newton showed that the existing jumble of disparate theories describing everything from planetary motion to tides to pendulums were all aspects of a universal law of gravitation. Unification has played a __1__ role in physics ever since. In the middle of the 19th century James Clerk Maxwell found that electricity and magnetism were two __2__ of electromagnet-

ism. One hundred years later electromagnetism was unified with the weak nuclear force __3__ radioactivity, in what physicists call the electroweak theory.

This quest for unification is driven by practical, philosophical and aesthetic __4__. When successful, merging theories clarifies our understanding of the universe and __5__ us to discover things we might __6__ never have suspected. Much of the activity in experimental particle physics today, at accelerators such as the Large Hadron Collider at CERN near Geneva, __7__ a search for novel phenomena __8__ by the unified electroweak theory. In addition to predicting new physical effects, a unified theory provides a more aesthetically satisfying __9__ of how our universe operates. Many physicists share an intuition that, at the deepest level, all physical phenomena match the __10__ of some beautiful mathematical structure.

A) conforms	I) applications
B) impression	J) famous
C) otherwise	K) involves
D) central	L) patterns
E) picture	M) facets
F) considerations	N) leads
G) remains	O) predicted
H) governing	

Ⅲ Translation

(1) The stunning recent announcement of neutrinos apparently exceeding the speed of light was greeted with startled wonderment followed by widespread disbelief.

(2) Recent calculations also suggest that any neutrinos traveling faster than light would have radiated most of their energy away before reaching detectors, something the researchers did not see.

(3) One explanation that a number of researchers have proposed is that the neutrinos might be traversing extra dimensions of reality beyond the familiar three of space and one of time.

(4) A challenge to Gardner's model comes from analysis of neutrinos from supernova SN 1987A, which strongly indicated the ethereal particles obey the cosmic speed limit.

(5) Perhaps this explosion behaved differently from more familiar supernovae, with its neutrino and light bursts occurring farther apart in time, and only by a fantastic coincidence did astronomers detect them close together.

(6) It is either a fantastic discovery which seemingly cannot but have huge and as yet unknown consequences or it is a mistake.