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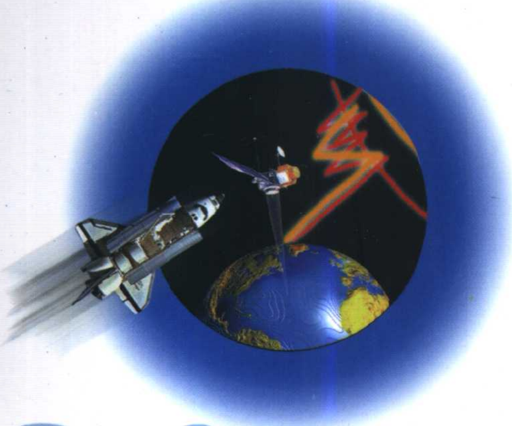

杨宏 编

# 航空航天科学

# Space and Aviation Science

华中科技大学出版社

科技英语阅读系列

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**图书在版编目(CIP)数据**

航空航天科学/杨宏 编
武汉:华中科技大学出版社,2002年11月
ISBN 7-5609-2869-2

Ⅰ.航…
Ⅱ.杨…
Ⅲ.空间科学-科普读物
Ⅳ.V1:H319.4

科技英语阅读系列
**航空航天科学** 杨 宏 编

策划编辑:梅欣君
责任编辑:张 欣 封面设计:刘 卉
责任校对:刘 飞 责任监印:张正林

出版发行:华中科技大学出版社 武昌喻家山
邮编:430074 电话:(027)87545012

录 排:华中科技大学惠友文印中心
印 刷:武汉市科普教育印刷厂

开本:787×1092 1/32 印张:4.75 字数:80 000
版次:2002年11月第1版
印次:2002年11月第1次印刷
ISBN 7-5609-2869-2/V·1
印数:1—3 000 定价:6.80元

# 内容提要

本书涉及航空航天这一重要科学领域，介绍了此领域中的科技研究动向和发展成果。文章主要选自近期的英美主要报刊，内容新颖，可读性和趣味性强。

本书可供具有中等英语水平的英语学习者和科技工作者使用，也适用于对航空航天感兴趣的读者。

# 前　言

《航空航天科学》介绍了航空航天领域最新的研究发展和科技成果，内容新颖，涉及面宽，可供中等英语水平的英语学习者和广大对航空航天感兴趣的读者使用。

本书共选18篇文章，文章主要来自近期英美一些较有影响的重要报刊，如《经济学家》、《读者文摘》、《大众科学》、《时代》周刊、《金融时报》等等。文章融知识性、科学性、可读性、时代感于一体，向广大读者提供了当今世界航空航天领域科技发展的新趋势和新成果。每篇文章后都注有生词与难句解释，帮助读者更好地理解全文，并对科技文章的翻译可窥一斑。文章后的习题注重四部分的测试：对文章中心的把握；一些常用词汇的应用；文章内容的正确理解和科技文章的翻译。其后所附答案可供读者进行自我检查，也引导读者对文章的深入理解。

使用此书的读者应掌握科技文章自身的一些特点，在此基础之上，注意运用好的阅读方法，培养良好的阅读习惯，力求在了解一定的航空航天知识的同时，提高自己的阅读技能。阅读科技文章的时候，要避免频繁使用辞典，注重培养根据上下文或从词根、词缀猜测词义的能力和技巧，同时要努力提高自己推断、掠读技巧以及语篇分析能力。

鉴于编者学识有限，本书难免有疏漏和不足之处，望读者不吝赐教。

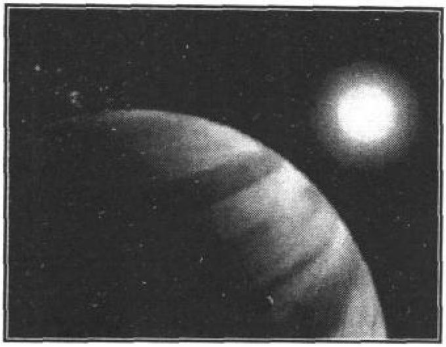
编 者

2002 年 7 月

# Contents

# 1. The Prints of Darkness

## 黑暗的印记



*1* Whereas astrologers search the stars for hints at human destiny, astronomers are hunting for hints at the universe's. In 1998, the oracles were in a tizzy. Studies of supernovae in distant galaxies showed that the universe's expansion was accelerating. The discovery was baffling: after the initial Big Bang had propelled matter outwards, the attractive force of gravity should gradually have braked the universe's sprawl. Either the theory of gravity —and, with it, all its predictions—was flawed. Or some unknown physical force was driving mater out at ever-faster speeds. Physicists dodged the first bullet, and instead bit the second, dubbing this mysterious force "dark energy". And having named it, they want to measure it.

*2* At a conference of the American Physical Society held a few days ago in Albuquerque, New Mexico, two teams of researchers presented plans for telescopes which could do just that. Though very different in approach, both projects would work by studying the past formation of galaxy clusters — collections of hundreds of individual galaxies that are among the largest structures in the universe.

Cluster-bombing the problem

*3* Initial calculations suggest that the previously unsuspected dark energy actually accounts for two-thirds of the substance of the universe. Surprisingly, that helps. Before 1998, most physicists believed that the universe contained far too little matter and energy. The more awkward question is whether the amount of dark energy is changing. If dark energy has always been as prevalent as it is now, then the universe will probably expand forever. If, on the other hand, it has gradually dissipated over the aeons, the universe's expansion could eventually slow to a halt, or even go into reverse.

*4* Measuring any change in dark energy requires creative thinking, which is where the clusters come in. The rate at which galactic clusters form depends, in part, on the amount of dark energy around at the time. Because it opposes the attractive force of gravity, dark energy tends to inhibit cluster formation. So if dark energy has declined as the universe has aged, clusters would have appeared more slowly in the distant past than in the recent past. If, however, it has remained constant, the rate of cluster formation should have remained constant, too.

*5* John Carlstrom, of the University of Illinois at Chicago, and his colleagues suggested to the conference that this might be detected by examining the cosmic microwave background (CMB), the hum of radiation that has blanketed space since the Big Bang. As galaxy clusters form, they create clouds of hot electrons. These electrons deflect a small proportion, about 1%, of the background microwaves. Whereas the CMB normally gives the universes a temperature of about 3 degree above absolute zero, a hot, gaseous galaxy cluster would turn up as a region of sky about a thousandth of a degree cooler, because of the microwaves that have been diverted away from it, a phenomenon known as the Sunyaev-Zel'dovich effect (SZE). A radio telescope listening to the CMB will "hear" this cold spot in the background.

*6* Dr Carlstrom says this method may be particularly useful because the SZE is detectable over much longer distances than light or X-rays. Light becomes fainter as it travels through space, but distortions produced by the SZE will persist indefinitely. This means that a telescope tuned to detect cold spots could see much older clusters than one that is trained only on distant sources of light.

*7* Dr Carlstrom and his colleagues propose building an eight-meter-diameter radio telescope at the South Pole to search for such cold spots. The altitude, low temperatures and lack of sunlight (at least during the Antarctic winter) make the atmosphere at the pole ideal for star-gazing. The South Pole Telescope could thus see 10 billion years into the past, and might turn up thousands of clusters — more than enough to study the evolution of dark energy.

*8* Another group of researchers wants to study galaxy clusters using a phenomenon called gravitational lensing. Because gravity pulls on light as well as matter, when light passes by a heavy object it bends as though it is passing through a lens. Tony Tyson and David Wittman, who work at Lucent Technologies' Bell Laboratories, in New Jersey, and their collaborators have proposed building a telescope that estimates the distribution of mass in the past by analyzing these deflected light-waves, a technique known as three-dimensional mass tomography.

*9* Light deflects around invisible matter in the same way that water ripples over hidden stones. Studying the ripples allows the mass of the deflecting objects to be calculated. If those objects are galaxy clusters, the growth-rates of such clusters at different times can then be worked out, and inferences drawn about the history of dark energy. Dr Tyson and his colleagues have recently finished making a preliminary design for such a device, which has been named the Large-aperture Synoptic Survey Telescope (LSST).

*10* Physicists, and even more importantly their paymasters, must now weigh the merits of the two proposals. Because the LSST relies on studying distortions of light, it cannot see more than about 8 billion years into the past. But Dr Wittman argues that the LSST, unlike the South Pole Telescope, will be able to detect anything massive, not just stuff that once held hot gas. Moreover, he says that the LSST will have other uses, such as discovering more supernovae. That would provide yet another way to measure dark energy, as well as yielding results in other areas of astronomy. On the other hand, the LSST project is far more expensive. The $20m bill for the South Pole Telescope project would pay only for the camera on the LSST; the total bill for the latter comes to $110m.

*11* Astrophysicists, though, are a co-operative bunch. Given the different strengths of the two telescopes it would be good, say the scientists involved, if both were built. That way, any conclusions about dark energy could be checked against the results of an independent investigation. “No one is going to overturn his theory of the universe based on just one set of measurements,” says Dr Wittman. Among astrophysicists, the hunt for darkness is all sweetness and light.

## 注释

astrophysicist [ˌæstrəu'fizisist] 天体物理学家
Oracle ['ɔrəkl] 神谕论
tizzy（sl）['tizi] 情绪亢奋、狂乱
baffling ['bæfliŋ] 令人困惑的
sprawl [sprɔːl] 任意蔓延
dodge [dɔdʒ] 避开
dub [dʌb] 称之为
prevalent ['prevələnt] 普遍的，流行的
dissipate ['disipeit] 消散
aeon ['iːən] 无限长的一段时间，永久
cosmic microwave background 宇宙微波本底
electron [i'lektrɔn] 电子
divert [dai'vəːt] 使转向
gravitational lensing 重力透镜化
tomography [tə'mɔgrəfi] 层析 X 射线摄影法
inference ['infərəns] 推论
merit ['merit] 优点，功能
bunch [bʌntʃ] 串，群体
overturn [ˌəuvə'təːn] 翻覆，推翻
supernova [ˌsuːpə'nəuvə] (*pl.* -vae [-viː] or -s) 超新星

## 难句解释

1. Physicists dodged the first bullet, and instead bit the second, dubbing this mysterious force "dark energy". And having named it, they want to measure it. [para.1]
物理学家们都不考虑第一种可能，却勇敢地挑战第二种可能，并将这种神秘的力量命名为"暗能"。
2. The rate at which galactic clusters form depends, in part, on the amount of dark energy around at the time. [para.4]
一段时期内，星系群形成的速度一方面由附近存在的暗能决定。
3. Whereas the CMB normally gives the universes a temperature of about 3 degree above absolute zero, a hot, gaseous galaxy cluster would turn up as a region of sky about a thousandth of a degree cooler, because of the microwaves that have been diverted away from it, a phenomenon known as the Sunyaev-Zel'dovich effect (SZE). [para.5]
由于通常是宇宙处于比绝对零度高出3度的温度环境，所以发现某处天空下降了千分之一度时，就意味着找到了一个热气态的星系群，这是因为微波被折射而导致的温度下降。这种现象被称之为Sunyaev-Zel'dovich效应。

## *Exercise*

### Ⅰ. Looking for the main idea

Tick the following sentence which best express the main idea of the article.

A. The passage puts forward two possible projects to study dark energy.

B. The passage describes dark energy and its function.

C. The passage introduces the history of scientists' study of dark energy.

### Ⅱ. Vocabulary in context

Find the vocabulary using the paragraph markers [ ] indicated beside each word. Read the sentence the word is found in from the context, guess the meaning. Then match each one with its best definition or synonym.

| | |
|---|---|
| 1. baffling [para.1] | A. spread |
| 2. brake [para.1] | B. advantage |
| 3. sprawl [para.1] | C. disappear or scatter |
| 4. dissipate [para.3] | D. stop or slow |
| 5. divert [para.5] | E. confusing |
| 6. merit [para.10] | F. deflect |

### Ⅲ. Checking the facts

Read the passage carefully, and decide if the following sentences are TRUE or FALSE. Highlight the sentences or the phrases which support your answer.

___1. Because of the discovery that the universe's expansion was accelerating, physicists began to challenge the theory of gravity and all its predictions.

___2. If dark energy has dissipated, the rate of cluster formation would have become always faster.

___3. When microwaves have been deflected by electrons from a region of sky, the temperature of the sky will cline slightly.

___4. The South Pole Telescope might also detect other thing massive.

___5. Besides galaxy clusters, supernovae would also be helpful to measure dark energy.

## Key to Exercise

Ⅰ. Looking for the main idea: A

Ⅱ. Vocabulary in context: 1. E 2. D 3. A 4. C 5. F 6. B

Ⅲ. Checking the facts: 1. F 2. T 3. T 4. F 5. T