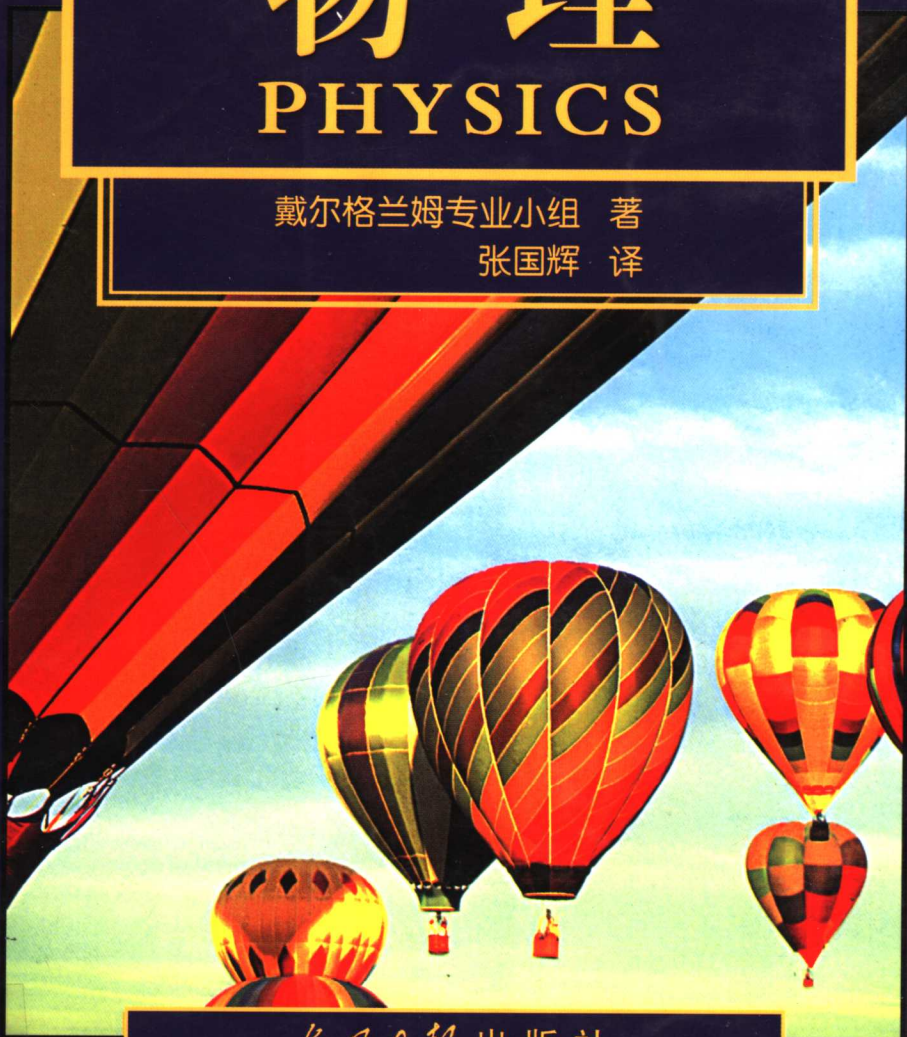


科学分类手册  
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# 物理

## PHYSICS

戴尔格兰姆专业小组 著  
张国辉 译



光明日报出版社

科學計劃事業  
SCIENCE PLAN PROJECT

# 物理

## PHYSICS

編輯：陳建宏 編  
審：陳建宏 編

九年級物理教科書

科学分类手册

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(美)戴尔格兰姆专业小组 著  
张国辉 译

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# 原书导言

对科学的理解是所有技术进步的基础,只有通过对支撑物质世界原理的科学研究,我们日常生活的改善、财富的增加、城市的进步以及产业的升级才有望变成可能。但是,若不借助于一定范围内的书籍,而得到对任何科学分支的全面了解将是困难的。术语词典、百科全书、人物传记以及科学大事年鉴,这些知识的集合一般都包含了各科学领域里的知识。

由美国 Facts On File 出版社出版的《科学分类手册》系列涵盖了如下学科:物理、几何、代数、微积分、化学、生物、地球科学、海洋科学、空间与天文学、天气与气候。《科学分类手册·物理》把大量的信息压缩成精致的内容,简洁、全面又易于理解。本书包括 4 个主要部分:术语、人物介绍、大事记、图和表,最后附有便捷的索引,方便学生和教师快速查证。

■术语:涵盖了 1400 多个词条,许多条目还附有简图,以帮助解释术语的含义。主题包括:加速度、沸点、催化剂、数据通讯、电解、 $\gamma$  辐射、透镜、微波、相对原子质量、热传导以及 X 射线等等。

■人物介绍:描述了从古至今的 300 多位科学家和物理学家,他们的发现促进了人类对物理学的认识与理解。这些科学家包括:A. G. 贝尔、A. H. 康普顿、皮埃尔·居里、C. 多普勒、阿尔伯特·爱因斯坦、欧几里得、G. D. 华伦海特、H. W. 盖革、S. 霍金、毕达哥拉斯、E. 瓦尔德和 R. 耶洛等。

■大事记:跨越了从古至今近 9000 多年的物理学的发展历史,包含了有关物理学的重大发现和重要事件;古希腊哲学家多克勒希



提出物质的四元素(火、气、水、土)理论(公元前 440 年);算盘作为辅助计算工具在欧洲使用(公元 500 年);英国数学家 W.奥特雷德引入“ $\times$ ”符号表示乘法(1631 年),德国物理学家 E.戈德斯坦发现阴极射线(1876 年)等。

■图和表:查找任何一个专业的基础信息相对比较困难,将有关图表和常用信息汇集起来,为学生和教师提供了重要的资料。

本书把物理置于科学的大背景之下,突出了所有学科间的紧密联系,更可比较、融会各学科领域中的信息。

SECTION ONE

# **GLOSSARY**

# 第一章 术 语

- A(r)** The symbol for relative atomic mass.
- ab-** An abbreviation for "absolute" and a prefix applied to practical electrical units, such as volt (abvolt), ampere (abampere), or coulomb (abcoulomb), to convert them to units in the absolute electromagnetic system of units.
- aberration** A defect in the image produced by a lens or mirror caused when rays do not converge accurately to the focus. It is technically difficult to produce a lens or mirror without aberration. *See also* chromatic aberration, spherical aberration.
- absolute code** Computer program code in a form that can be used directly by the central processing unit. More commonly known as machine code.
- absolute zero** The lowest possible temperature. Zero on the Kelvin scale or  $-273^{\circ}\text{C}$  ( $-460^{\circ}\text{F}$ ). Absolute zero is unattainable, but temperatures within one millionth of a degree have been reached. At temperatures approaching absolute zero matter exhibits some unexpected properties. Electrical conductors become superconducting and some fluids lose their viscosity (superfluidity). In the Kelvin scale, which has no negative figures, the symbol for degrees is not used after the number. So the freezing point of water is 273K, not  $273^{\circ}\text{K}$ .
- absorbed dose** (of ionizing radiation) The energy absorbed in body tissue by ionizing radiation; unit of measurement, the gray (joule per gram).
- absorption** (1) The assimilation of radiation into a body with its partial or complete conversion into another form of energy (such as heat, light, sound, etc.).  
 (2) The way in which certain wavelengths in a beam of radiation are removed when passing through a substance. The resulting spectrum of radiation can be used in spectroscopy to analyze the substance.  
 (3) The process by which one material, e.g., water, is taken up by another, e.g., a sponge.
- absorption factor** Energy absorbed by a body depends on the nature of its surface. Shiny, light-colored surfaces absorb less than dark, matte surfaces.
- absorption spectrum** The spectrum that forms when radiation with a range of wavelengths passes through a sample. Some wavelengths are absorbed by the sample, leaving gaps in the spectrum.
- AC** Abbreviation for alternating current.

**A(r)** 相对原子质量符号。

**Ab-** “绝对”的缩写；实用电磁单位的前缀，如电压单位(abvolt)、电流单位(abampere)、电量单位(abcoulomb)，在原来单位前加上该前缀，从而把它们换算成绝对电磁单位。

**像差** 透镜或面镜成像时，由于光线没有完全会聚到焦点而引起的图象模糊等缺陷。工艺上生产没有像差的透镜或面镜是困难的。参见“色差”与“球面像差”。

**绝对代码** 可以直接被计算机中央处理器使用的程序代码，通常被称为机器代码。

**绝对零度** 自然界可能的最低温度。开尔文温标的零度，或 $-273$ 摄氏度( $-460$ 华氏度)。绝对零度是不能达到的，但科学家已经实现了百万分之一度的温度。在温度趋于绝对零度时，物质会呈现出意想不到的性质。如导体将变为超导体，一些流体会失去粘性(超流性)。在开尔文温标中，没有负的温度，数字后面没有表示度的圆圈符号，如水的冰点是 $273\text{K}$ ，而不是 $273^\circ\text{K}$ 。

**(电离辐射的)吸收剂量** 人体组织所吸收的电离辐射能量，度量单位为戈瑞(焦耳每克)。

**吸收** (1)进入物体内的辐射，部分或全部转化为另一种能量(如热能、光能、声能等)。

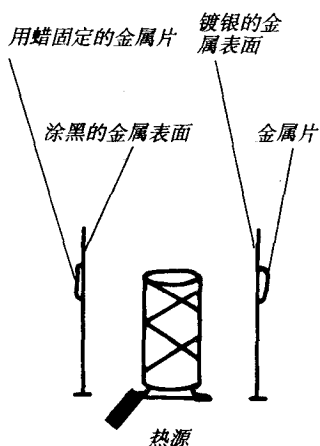
(2)一束辐射通过物质时，其中某些波长成分被滤除的过程。用这种方法得到的辐射谱可在光谱学中用来分析物质的成分。

(3)一种物质(如水)被另一种物质(如海绵)吸取的过程。

**吸收因子** 物体对能量的吸收取决于其表面的性质。光亮的、浅颜色的表面要比暗色的、粗糙的表面吸收的少。

**吸收光谱** 一定波长范围的辐射通过某种样品后形成的谱。某些波长的辐射被样品吸收掉了，在光谱中留下一些间隙。

**AC** 交流电的缩写。



吸收因子

**acceleration** A measure of how the velocity of a body changes with time. It occurs if there is a change in the body's speed or direction of motion; a force is required to effect such a change. A falling body whose motion is solely governed by the downward force of gravity is said to be in free fall. The body moves with constant acceleration. In SI units, acceleration is expressed in meters per second per second. It can be calculated by subtracting the final velocity from the initial velocity and dividing the result by the time. Acceleration is a vector quantity. If velocity is plotted against time on a graph, the acceleration at any moment is given by the slope of the graph at that moment.

**acceptors** Atoms of an element such as boron added to a silicon lattice to affect the conducting properties of semiconductors. The acceptor atoms create holes in the valence band to carry current; this is a p-type (positive carrier) semiconductor.

**access time** The time taken to retrieve a small item of data from any form of storage in, or connected to, a computer. Access time from RAM may be a very small fraction of a second; from a large magnetic tape store it may be several minutes. Floppy disk drives have longer access times than hard disks, and most CD-ROM drives also have longer access times than hard disks.

**accommodation** The adjustment of the focus of the eye so that, whatever the range of gaze, a sharp image is formed on the retina. Accommodation is achieved by the internal crystalline lens, which in young people is naturally so elastic that it would tend to approximate to a sphere but for the pull all around its equator by delicate ligaments that suspend it from a circular muscle. When this muscle contracts, the circle becomes smaller and the pull on the lens is less, thus making it a more powerful converger of light and allowing focusing of the image from near objects. When the ciliary muscle relaxes, more distant objects can be focused. The stimulus for accommodation is the degree of convergence of the rays of light, which can be detected by the variations in depth to which the rays penetrate the light-sensitive cells of the retina.

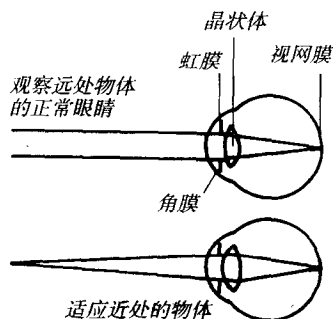
**accumulator** (1) An electric battery in which the passage of an electric current from an external source brings about a reversible chemical change by which energy is stored. When the electrodes are joined, a current flows and the previous chemical state is restored.  
(2) In computing, an accumulator is a small memory or buffer that briefly holds the results of successive operations by the arithmetic and logic unit of the central processing unit.

**加速度** 物体运动的速度随时间变化的量度。当物体运动速度的大小或运动的方向改变时物体就会有加速度;而要产生加速度需要有力作用在物体上。只受向下的重力作用的落体运动称为自由落体运动,自由落体以恒定加速度运动。在国际单位制中,加速度的单位是米/秒<sup>2</sup>。加速度可以通过末速度与初速度之差除以时间得到。加速度是个矢量。在速度-时间图上,任意时刻的加速度等于该时刻图线的斜率。

**受主** 掺到硅晶格中用来影响半导体导电性能的某种元素的原子,比如硼。受主原子在价带中产生空穴从而导电,这是一种 p 型(正载流子)半导体。

**存取时间** 找到并读出存放在计算机内的某种存储器中或与计算机相连的存储器中的一定量数据所需要的时间。随机存储器的存取时间远远小于一秒钟,大型磁带的存取时间可能有几分钟,软盘驱动器的存取时间比硬盘驱动器长,大多数光盘驱动器的存取时间比硬盘驱动器长。

**适应性调节** 不论要观察的物体离眼睛有多远,眼睛通过对焦距的调整,使视网膜上成清晰的象。调节是通过眼睛内的晶状体来实现的。年轻人的晶状体非常有弹性,如果没有晶状体周围与环肌相连接的精巧韧带的拉力,晶状体将近似成为一个球形。当环肌收缩时,圆环会变小,对晶状体的拉力变小,于是聚光能力更强,可以对近处物体聚焦成象。当睫状肌松弛时,可以对远处的物体聚焦成象。光线的会聚程度引发对调节的刺激,而光线的会聚程度可以根据穿过视网膜上光敏细胞的光线强弱被探测到。



适应性调节

**蓄电池,累加器** (1)通过外部电流引发可逆的化学变化来储存能量的一种电池。当蓄电池电极连通时会产生电流,使原先的化学状态逐渐恢复。  
(2)在计算过程中,累加器就是用来短暂储存中央处理器的算术逻辑单元连续操作结果的小存储器或缓冲器。

**AC electric motor** An electric motor that operates from an alternating electric current supply.

**achromatic lens** A lens that is free from chromatic aberration. An achromatic lens is constructed from two types of glass, each having a different refractive index, so that the dispersions cancel each other. This form of double lens has the effect of reducing the dispersion of light of different wavelengths, producing a sharper focus with greatly reduced color fringes around the edges of the image.

**acoustic coupler** An early form of modem that can be temporarily attached to a normal telephone. The digital signal to be transmitted is converted into a two-tone sound that is emitted by a small loudspeaker pressed to the telephone microphone. The received signal is picked up by a microphone held close to the telephone earpiece. The system allows modem communication from any location where there is a telephone, but the speed of transmission is low. Acoustic couplers are now seldom used.

**actinic radiation** Radiation, especially light and ultraviolet radiation, that can cause a chemical change, such as the latent image on a photographic emulsion or the breakdown of biological or other molecules. The Sun is a major source of actinic electromagnetic radiation.

**actinium series** A series of radioactive elements each of which derives from the radioactive decay of its predecessor and ends in a stable atom. The actinium series starts with uranium-235 and ends in an isotope of lead. Two other such series occur naturally, one starting with uranium-238 (uranium series) and the other with thorium-232 (thorium series), both also ending with an isotope of lead.

**action at a distance** Forces such as gravity and magnetism can affect objects not in direct contact with the force. The space through which the forces operate is called a field. For example, a gravitational field is a region in which there are gravitational forces.

**activation energy** The energy barrier to be overcome in order for a reaction to occur. Many chemical reactions require heat energy to be applied to reactants in order to initiate a reaction.

**active device** A component in an electronic circuit that consumes power to effect a change, such as amplification or current switching. Transistors are active devices; resistors, capacitors, and inductors are passive devices that do not consume power.



**交流电动机** 在交流电源带动下运行的电动机。

**消色差透镜** 没有色差的透镜。消色差透镜是由两种类型的玻璃制造而成的,两种玻璃的折射率不同,使色散互相抵消。这种双透镜可以有效地减少不同波长的光的色散,产生强聚焦像,极大地削弱了像的彩色边缘。

**声耦合器** 早期的一种可以临时与普通电话接通的调制解调器。待传输的数字信号被转化成两种音调的声音,声音由靠近电话麦克风的小扩音器发出,信号的接收通过紧靠电话听筒的麦克风来获得。该系统可用于在任何装有电话的地点进行调制解调通讯,但传输速度很慢。声耦合器现在已很少使用。

**光化辐射** 辐射,特别是可以引起化学变化的光辐射和紫外辐射,如照相感光乳胶中的潜影,或生物与其他分子的分解等都是光化辐射引起化学变化的例子。太阳是主要的光化电磁辐射源。

**锕(放射)系** 是一组放射性元素,其中每一种都是由于前一种发生放射性衰变得来的,最后终止于一种稳定的原子。锕系元素起始于铀-235,终止于铅的一种同位素。另有两个天然放射系,其中一个起始于铀-238(钍系),另一个起始于钍-232(钍系),这两个系也都终止于铅的一种同位素。

**超距作用** 象万有引力与磁力等能够存在于非直接接触的物体之间,这类作用称为超距作用。用来进行相互作用的空间称为场。例如,引力场就是存在引力相互作用的区域。

**激活能,活化能** 发生反应所需要克服的能垒。许多化学反应需要给反应物提供热能才能得以发生。

**有源器件** 电路的一个组成部分,通过消耗能量来实现某种变化,如放大或电流开关等。晶体管就是有源器件,电阻、电容和电感则是不消耗能量的无源器件。