英汉对照

# English on Sunday

# 星期天英语

## 第7辑

主编：狄红秋 王 胜

天津大学出版社
TIANJIN UNIVERSITY PRESS

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# 前言

本书是天津大学出版社特邀山西大学、山东大学、中山大学、北京外国语大学、天津师范大学、天津科技大学、天津外国语学院部分专家为具有初、中级英语水平的英语爱好者编写的实用型休闲读物。全套共7辑，每辑栏目基本一致，话题内容多为青年人感兴趣的短文，且英汉对照。英文力求原汁原味，尽量不进行任何删节，保持语言的地道；中译文力求信、达、雅，透彻、简洁、易懂是我们的目的。

各辑话题主要包括"科海探索"、"网络时代"、"影海撷章"、"夜访百家"、"健康氧吧"、"坐看天下"、"假日自助餐"、"幽默天地"、"假日论坛"、"人生百态"、"生态环境"、"爱情宝典"、"奥运大家谈"、"海外教育"、"涉足商海"等。

本书突出趣味、隽永、精要、新颖、难度适中、雅俗共赏的风格。读者既可以从中研习语言要点、琢磨互译妙处、扩大词汇量，也可以诵读华章亮段和点睛妙笔，在潜移默化中还可以陶冶情操、增长见闻、丰富知识、增添生活乐趣。衷心希望《星期天英语》能在广大的英语爱好者中遇见知音，成为您的好朋友、好帮手及休闲时的好伙伴。

本辑主编狄红秋、王胜。参加编写的还有吴海涛、张蓉、齐世红、宁淑琴、程江威、王云鹤、贾建民。

由于编者经验不足，对一些文章的选取以及译文因作者水平有限，尚不能做到尽善尽美，文中纰漏之处，敬请斧正。

编　者

2003年10月

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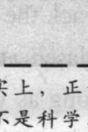
Science & Research

# 科海

*Science is built of facts the way a house is built of bricks; but an accumulation of facts is no more science than a pile of bricks is a house.*

*—J. H. Poincare*



# 探索

科学建立在事实上，正如房屋由砖砌成；但事实的积累并不是科学，正如一堆砖头并不是一所房子。

—J. H. 波恩卡雷

# High Hopes for a Super-Nava

In the lobby of Building No. 391 at Lawrence Livermore Laboratory near San Francisco stands a cast-iron sculpture of Shiva, the multiarmed god whose whirligig dances, according to Hindu tradition, alternately create and destroy all earthly life. Nearby is a wood-and-plastic model of Nova, the world's most powerful laser, which is housed in cavernous quarters the size of a football field. The juxtaposition of the two objects is apt, and for several reasons. Like Shiva, the $176 million laser bristles with its equivalent of arms: ten bright blue tubes, each a conduit for an intense laser beam. And like Shiva, Nova will dance to a schizophrenic tune: it could benefit life — and perhaps help to destroy it.

After the giant laser is dedicated in a ceremony at Livermore this week, scientists will employ its intense beam of light in an attempt to weld the nuclei of hydrogen atoms, releasing bursts of energy at temperatures exceeding those at the center of the sun. Should they succeed in harnessing nuclear fusion, they could point the way toward a limitless supply of cheap, clean power. "Once we crack the problem of fusion," says John Emmett, associate director for lasers at Livermore, "we have an assured source of energy for as long as you want to think about it. It will cease to be a reason for war or an influence on foreign affairs."

As the second step in Nova's dance, however, weapons designers will put its powerful beams to a less benign purpose: to improve thermonuclear bombs by mimicking certain reactions in the controlled setting of a laboratory. That will save the Pentagon the expense of having to try out every newly designed bomb at an underground test site in Nevada, a procedure that costs about $10 million per explosion. Eventually, Nova could also be used in research for the Star Wars defense program.



The awesome might of fusion energy can be explained by Albert Einstein's famed equation, $E = mc^2$. When two nuclei from hydrogen atoms are shoved together to become a single, heavier helium nucleus, a tiny bit of their individual masses is converted into a tremendous amount of energy. In weapons, that energy is uncontrolled and destructive. To channel it into a usable form, scientists must be able to control the fusion reaction and confine it to a chamber, which requires surmounting some formidable physical constraints. The hydrogen nuclei must be crushed together with enough force to overcome their mutually repellent positive electric charges. In H-bombs, that force is supplied by the detonation of a fission bomb, or A-bomb.



But A-bombs cannot be exploded in power plants, and when Lawrence Livermore scientists begin their experiments six weeks from now, they will use powerful laser beams instead. In Nova, under the guidance of more than 50 computers, a pulse of light is whipped around a master oscillator until all of its wavelengths are identical and in phase. The pulse of pure laser light is then split into ten parts, each of which races down its own 460-ft. -long tube equipped with amplifiers, spatial filters and isolators. As it emerges, each beam is focused to about the width of three human hairs, yet is a thousand trillion times brighter than the sunlight that falls on the earth. Together they deliver 100 trillion watts of power, about 200 times the present electricity-generating capacity of the U.S., albeit only for a billionth of a second.

The tubes terminate inside an airless 16-ft. -wide aluminum chamber, each entering it from a different direction. Inside, the focusing lenses are arrayed around a pellet of deuterium and tritium, two heavier varieties of hydrogen atoms. Scientists hope that when the beams simultaneously hit the pellet, which is smaller than a gram of sand, the temperature of the pellet's outer surface will be raised to 100 million degrees, causing it to vaporize explosively. Just as a rocket is pushed forward by its tail exhaust, the vaporizing surface would exert a force inward, compressing the pellet to a density 20 times that of lead and forcing the nuclei to fuse. In the fusion power plant of the future, Livermore scientists say, larger pellets will be blasted, one after another, producing successive bursts of energy.



Critics of the laser fusion program contend that it is five to ten years behind magnetic containment fusion, a technique that uses powerful magnetic fields to contain the reaction. But magnetic fusion, too, still has a long way to go. It has not yet even reached the stage at which the energy produced by the machines equals the energy required to run them.



## 译文

### 指日可待的超型激光器——"诺瓦"

在旧金山附近的劳伦斯·利弗莫尔实验室391号楼的大厅里，竖立着"西瓦"的铸铁塑像。据印度传说，这位多臂的主神以其急旋的舞蹈，一阵子创造世间生命，一阵子又把它们毁灭干净。在塑像附近有一个用塑料和木材制成的世界上功率最大的激光器"诺瓦"的模型。"诺瓦"安装在一个足球场大

小的洞穴里。由于几方面的原因，这两个物体并列置放极为合适。这台耗资1.76亿美元的激光器，跟“西瓦”一样也有许多手臂——十根亮堂堂的蓝色放电管，每根都是一束激光的导管。它还跟“西瓦”一样将随着疯狂的曲调起舞：它可能有助于人类生存，也可能有助于毁灭它。

本周在利弗莫尔举行过这台巨型激光器的交付使用的仪式后，科学家们将利用它的强光束密结氢原子核，从而以超过太阳中心温度的高温释放爆炸能。如果控制核熔融反应成功，他们就能为提供既廉价清洁而又用之不绝的能源开辟一条新的途径。利弗莫尔实验室负责激光器的副主任约翰·埃米特说：“一旦我们攻克了核熔融反应这一难关，我们就能找到永久性的可靠能源。那么，能源将再也不会是战争的一个祸根，再也不会影响外交事务了。”

然而，“诺瓦”迈出的第二个舞步将是武器设计者们把它的高能量激光光束转向一个不那么有益的目标：通过在实验室控制装置里进行某些模拟反应来改进热核武器。这将会为五角大楼在内华达地下实验场试验每种新式核武器节约大笔开支。每次爆炸试验的全过程耗资高达1 000万美元。最后，“诺瓦”还能用于“星球大战”防御计划的研究工作。

这种惊人的核聚变能量可以根据阿尔伯特·爱因斯坦的著名方程式$E=mc^2$来解释。当氢的两个原子核碰撞合为一个更重的氦原子核时，各自质量的一点点就转化成了巨大的能量。在核武器里，这种能量具有无法控制的破坏性。为了使这种能量成为可用的能源形式，科学家们必须能够控制核聚合反应，并把它限制在反应室内，而这种反应室必须能够克服某些难以对付的物理约束。使氢核碰撞的力量必须大到超过正电荷间的相互斥力。氢弹中这种力是由裂变式炸弹即原子弹爆炸时提供的。

但是，发电厂里不可能爆炸原子弹。当利弗莫尔的科学家从现在算起六周之后进行实验时，他们将采用强有力的激光束取代原子弹引爆。“诺瓦”在50多台电子计算机的指挥下，

光子脉冲在主振荡器四周受激，直到它们所有的波长相等、相位相同时为止。然后激光被分成10束，每束沿着各自的真空管发出。这些真空管长460英尺，装有放大器、空间滤光片和绝缘体。当光束射出时，每束光聚焦于三根头发粗细的一点上；然而，它却比照射到地球上的太阳光的亮度大1 000兆倍。虽然只有十亿分之一秒的时间，却能产生100兆瓦的峰值功率，大约是美国目前发电能力的200倍。

这些放电管汇集到一个16英尺宽的真空铝腔室里，每根管子从不同的方向伸入。铝腔室内，聚焦透镜的焦点从四周一齐对准了氘氚芯块（氘和氚是氢的同位素但比氢重）。科学家们希望在激光各光束同时打中比一粒沙子还小的芯块时，它的表层温度将升高到一亿度，使芯块汽化爆炸。正如火箭被其尾部喷气推进一样，汽化表层将向内加压，把这个芯块的密度压缩到铅的20倍，迫使原子核融合。利弗莫尔的科学家们说：在未来的热核发电厂里，较大的芯块将一个接一个地爆炸，不断地释放爆炸能量。

激光融合计划的批评家们认为，激光融合落后于磁性阻遏融合五至十年。磁性阻遏融合是一种利用强磁场控制核反应的技术，但它也仍需要很长一段时间才能完善。目前它甚至还没有达到这样一个阶段，即机器产生的能量恰好等于使机器运转所需馈入的能量。