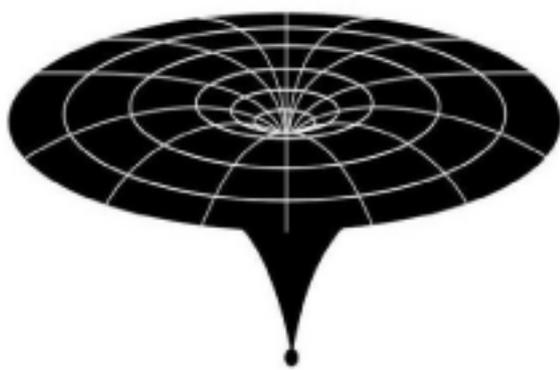


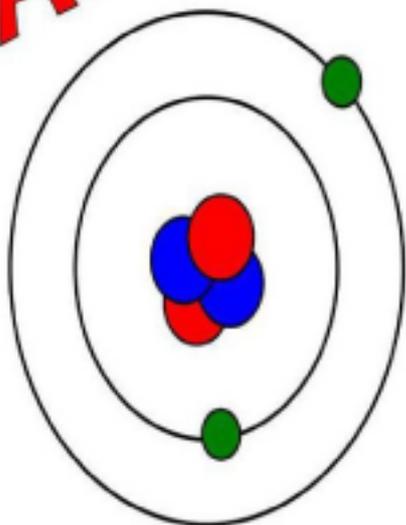
# The ABC's of Physics

宝宝的物理学 ABC

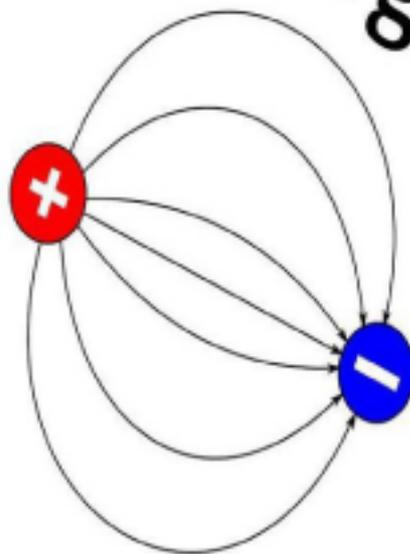
Black hole



Atom



Charge



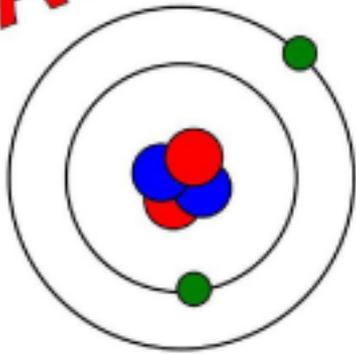
by Chris Ferrie

Edit by AD100

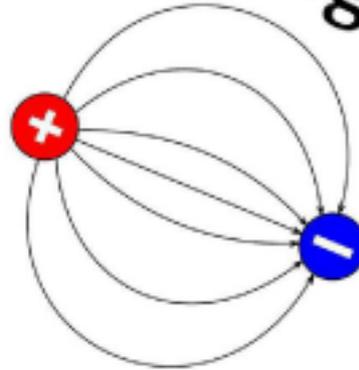
# The **A****B****C**'s of Physics

**B**lack hole

**A**tom



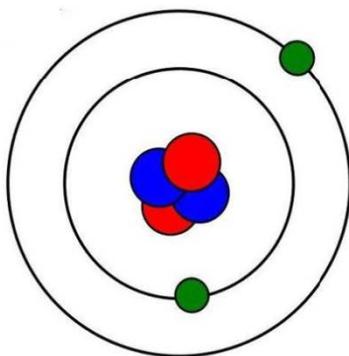
**C**harge



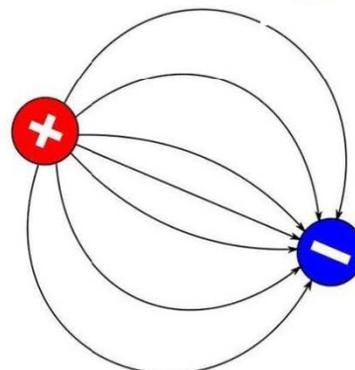
by Chris Ferrie

黑洞

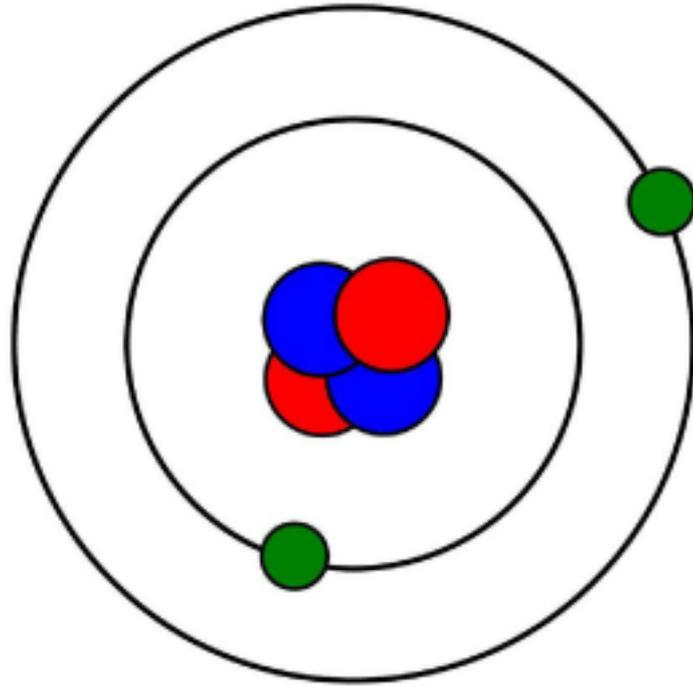
原子



电荷



# Atom

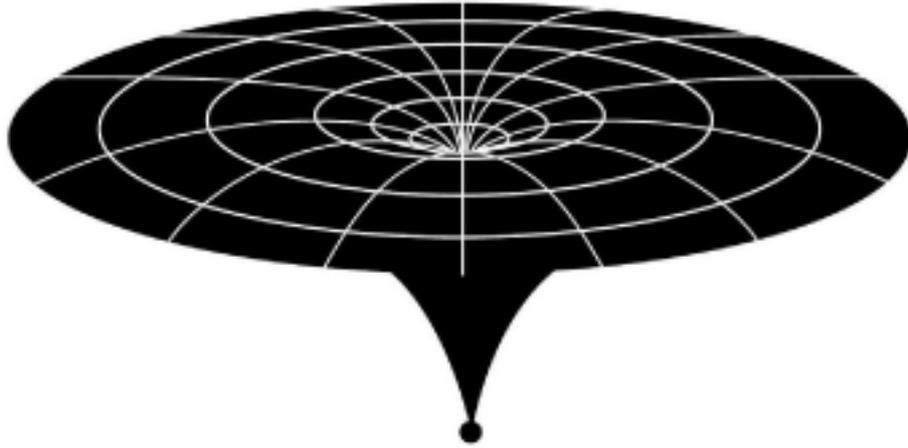


All things are made of atoms. Atoms are made of protons, electrons and neutrons. Atoms can combine to make molecules. When atoms smash together, they create a nuclear reaction.

## 原子

所有的物质都由原子构成。原子是由质子、电子和中子构成。原子能够组成分子。当原子间相互碰撞，他们就产生核反应。

# Black hole

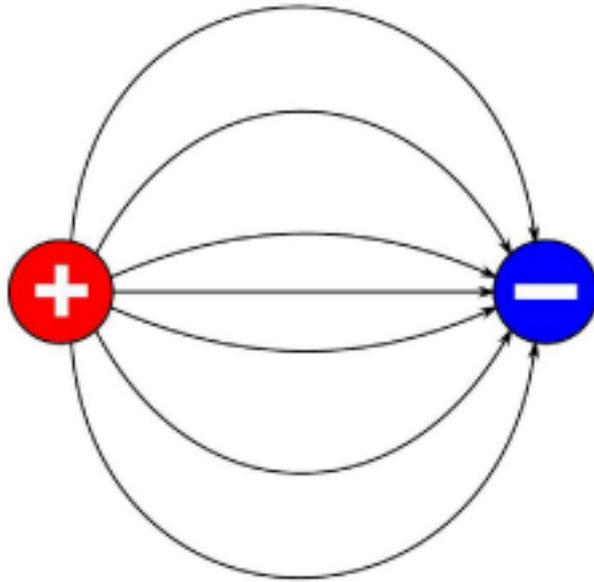


A black hole is a star so dense that not even light can escape its gravity. The boundary where this happens is called the event horizon. Many physicists believe that a very big black hole exists at the center of our galaxy.

## 黑洞

黑洞是一类非常紧密的星球，就连光都不能逃脱它强大的引力。黑洞的边界被叫做事件穹界。许多物理学家们相信在我们星系的中间存在一个非常巨大的黑洞。

# Charge

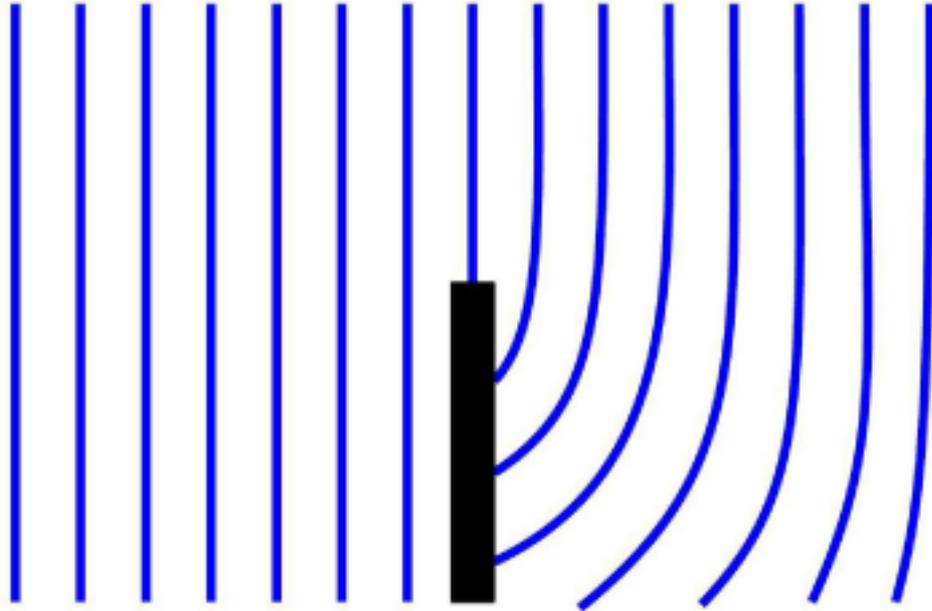


Charge is the physical property of matter which causes the effect of electrostatic attraction and repulsion. Charge can be positive or negative. Opposite charges are attracted and like charges are repelled.

## 电荷

电荷是物质的物理特性，它产生静电吸引和排斥效应。电荷能够是正电荷或者负电荷。相反的电荷间相互吸引，相同的电荷间相互排斥。

# Diffraction

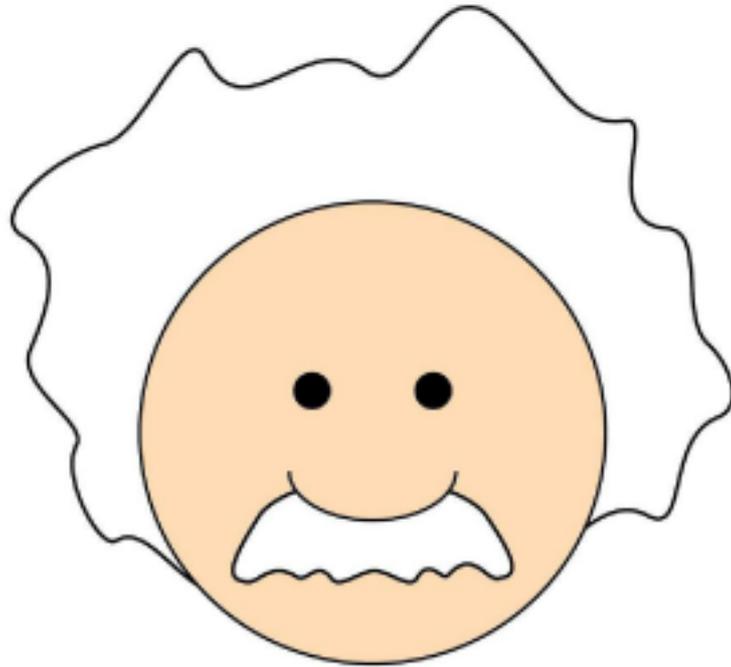


Diffraction occurs when a wave (water, light, sound, etc.) hits an object. When more than one object is hit, multiple diffraction events can create beautiful interference patterns.

## 衍射

当波（水波，光波，声波等）撞到一个物体时，衍射就产生了。当有多于一个物体被撞到时，衍射现象会产生美妙的干涉图案。

# Einstein

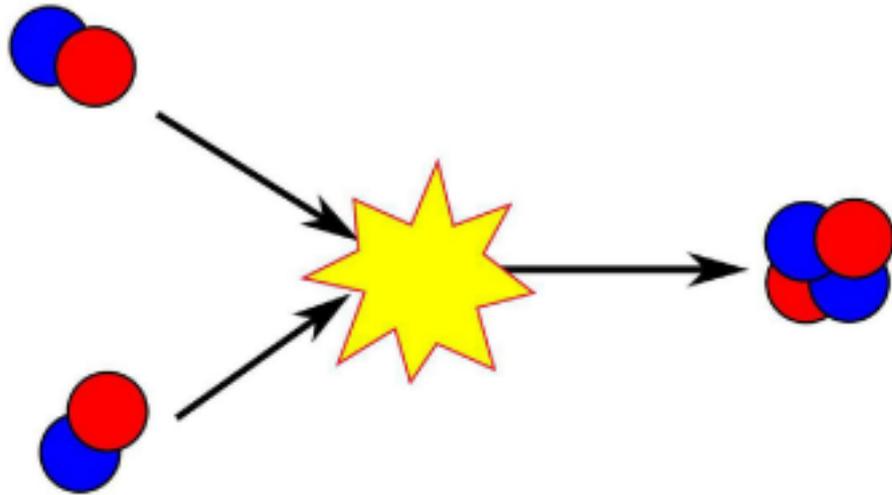


Albert Einstein is considered by many to be the greatest scientist to have lived. He made pioneering contributions to statistical physics and quantum theory. He also invented the theory of relativity.

## 爱因斯坦

阿尔伯特·爱因斯坦被许多人认为是历史上最伟大的科学家。他对统计物理学和量子理论作出了开创性的贡献。他也发明了相对论理论。

# Fusion

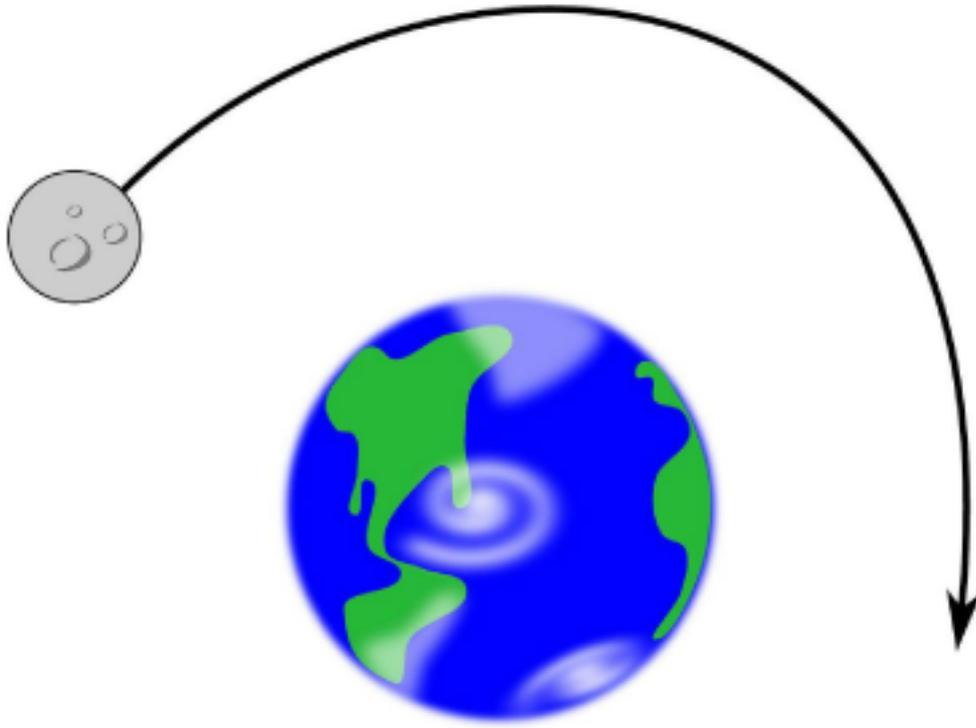


Fusion happens when two atoms collide and create a new atom. For some atoms, a lot of energy is created by this process. The sun is constantly fusing hydrogen into helium.

## 聚变

当两个原子碰撞并且生成一个新的原子时，聚变产生了。对于某些原子，在聚变的过程中产生大量的能量。太阳一直不断地把氢原子聚变成氦原子。

# Gravity



Gravity is the force that causes things to be attracted to each other, like the earth and moon. Gravity keeps the moon in orbit around earth and also brings us back down when we jump.

## 引力

引力是使物体间相互吸引的力，就像地球和月球的情况。引力使月球处在围绕地球的轨道上，并且让我们在跳起后返回到地面。

# Heat

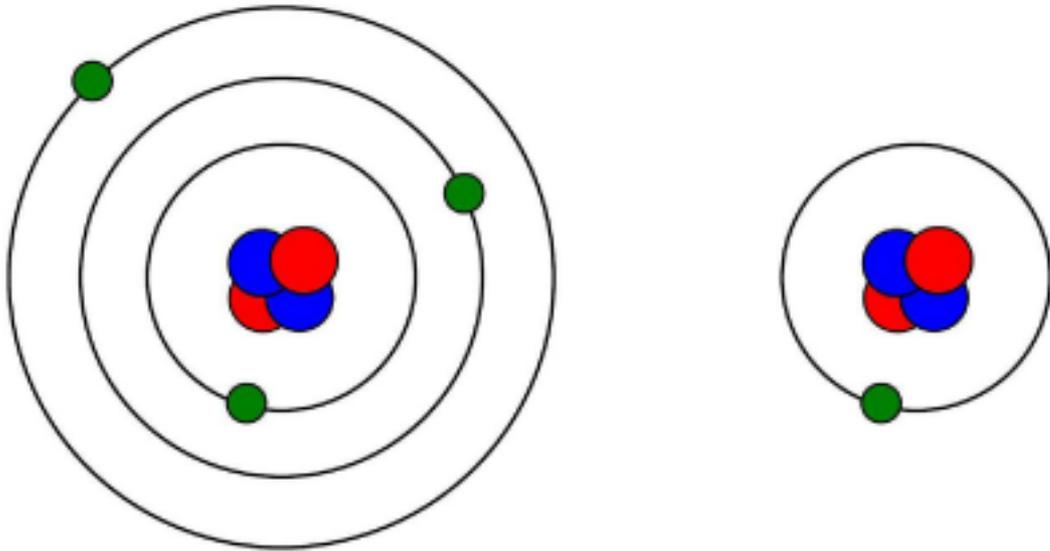


Heat is the transfer of energy from something hot to something cold. Fire is hot and gives off heat to its cooler surroundings. The sun is very hot and gives heat to the earth.

## 热量

热量会从热的物体传递冷的物体。  
火是热的，会散发热量到周边比较冷的物体上。  
太阳非常热，能散发热量给地球。

# Ion

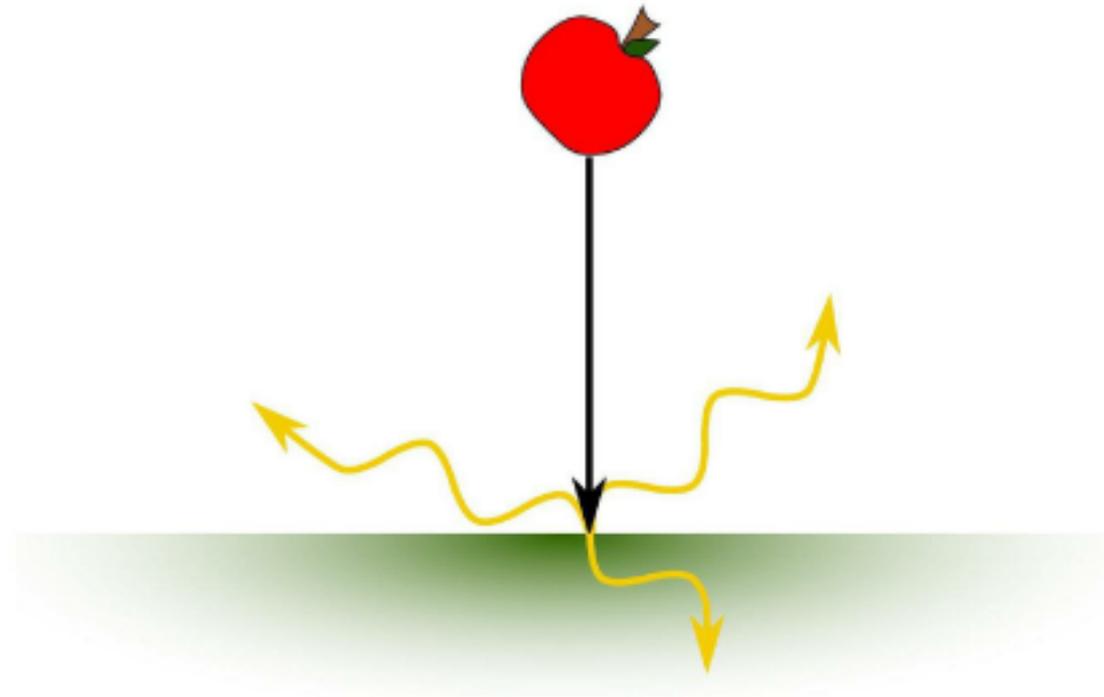


An ion is an atom that has more or less electrons than it has protons. An ion with more electrons has negative charge and an ion with less electrons has positive charge. Making an ion is called ionization.

## 离子

离子是一类原子，它的电子数量比它的质子数量或者多或者少。有较多数量电子的离子带负电荷，有较少数量电子的离子带正电荷。形成离子的过程被称作电离化。

# Joule

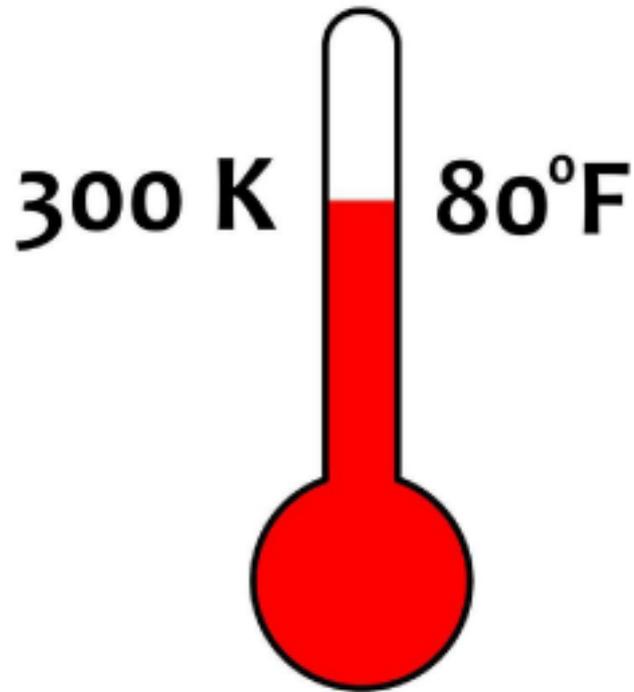


A Joule is the standard unit of energy. One Joule is the amount of energy released when a large apple falls one foot to the ground. The Joule is named after physicist James Joule who worked on thermodynamics.

## 焦耳

一焦耳是一个能量标准单位。一焦耳能量相当于一个大苹果从一英尺高的地方落到地面释放的能量。物理学家詹姆斯·焦耳研究热力学，焦耳是以他的名字命名。

# Kelvin

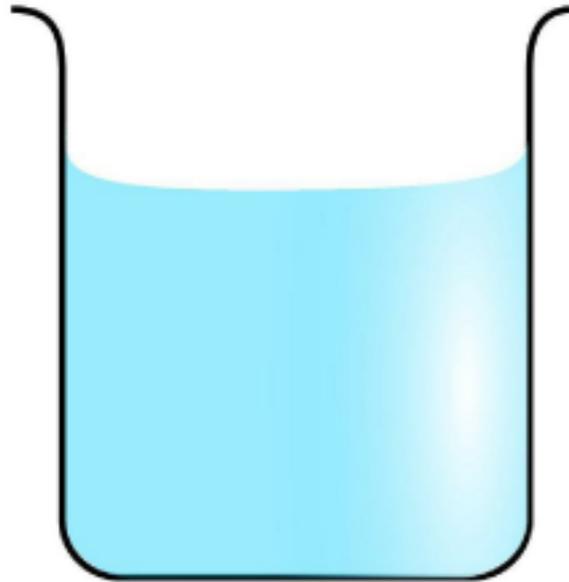


A Kelvin is the standard unit of temperature. The temperature where you are reading this book is close to 300 Kelvin. It was named after physicist William Thomson who later became Lord Kelvin.

## 开尔文

一开尔文是一个温度标准单位。你们正在读这本书地方的温度大概在 300 开尔文。开尔文是以物理学家威廉·托马斯的名字命名，他后来成为开尔文男爵。

# Liquid

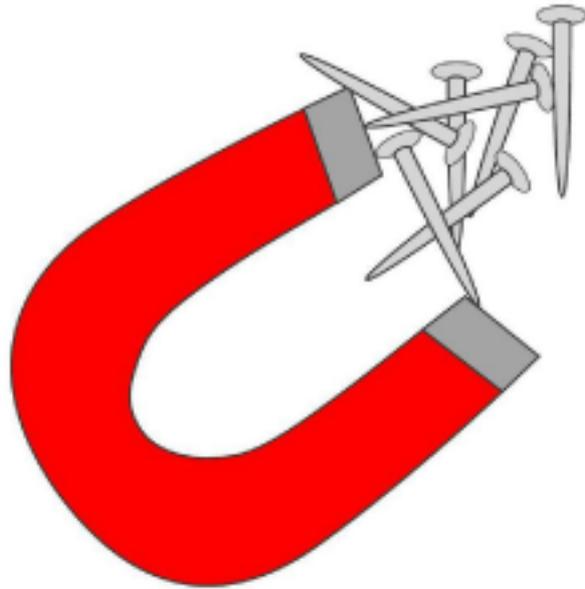


Liquid, solid and gas are the three primary states of matter. If a liquid gets too hot, it turns to gas. If it gets too cold, it turns to solid. Water is the liquid form of the compound  $\text{H}_2\text{O}$ . Boiling water turns it to gas—freezing it, to ice.

## 液体

液体，固体和气体是物体的三种主要的形态。如果液体变得太热了，它会变成气体。如果液体变得太冷了，它会变成固体。水是化合物  $\text{H}_2\text{O}$  的液体形态。加热水，它会变成气体——冷冻水，它会变成冰。

# Magnet

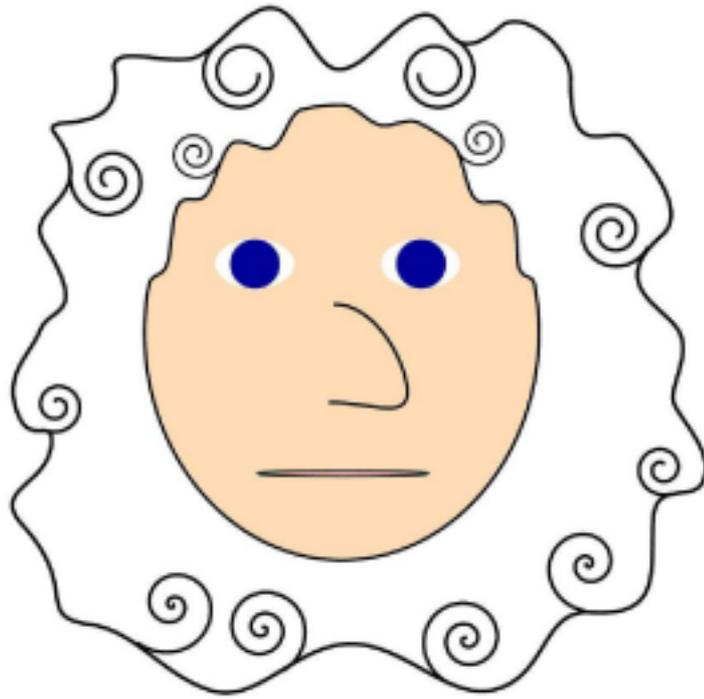


Magnets create magnetic fields which interact with all matter. Other magnets are affected the most. Magnets arise from either innate atomic properties or electric currents.

## 磁体

磁体生成和所有物体相互作用的磁场。有些磁体受到影响最大。磁体来自固有的原子特性，或者来自电流。

# Newton

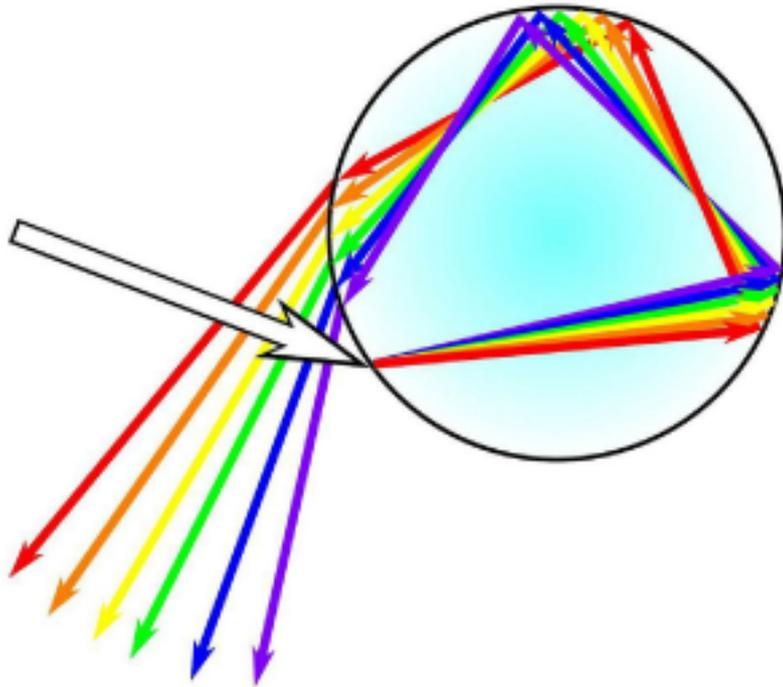


A Newton is the standard unit of force. It is named after physicist Isaac Newton. Newton is famous for his laws of motion which govern the dynamics of matter under the influence of forces. He also invented calculus.

## 牛 顿

牛顿是力标准单位。它以物理学家艾萨克·牛顿的名字命名。牛顿以发现物体运动定律闻名，在力的作用下，物体按照运动定律运动。他也发明了微积分学。

# Optics

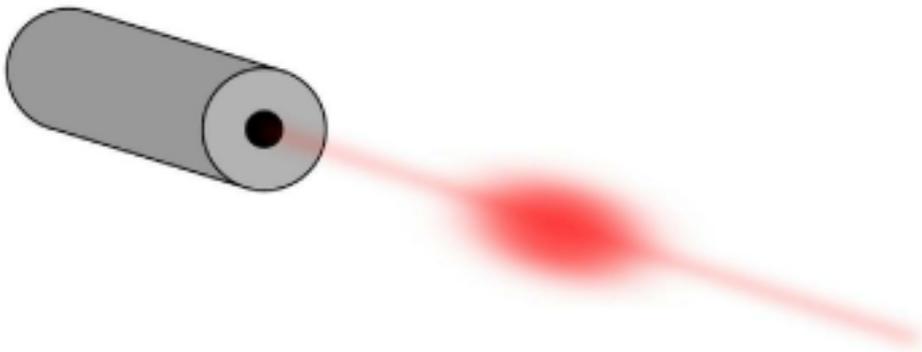


Optics is the study of how light interacts with matter. It helped with the invention of eyeglasses and telescopes. After the quantum nature of light was discovered, the study of optics lead to lasers.

## 光学

光学是一门研究光和物质相互作用的学科。光学推动发明了眼镜和望远镜。在光的量子特性被发现后，光学的研究推动发明激光。

# Photon

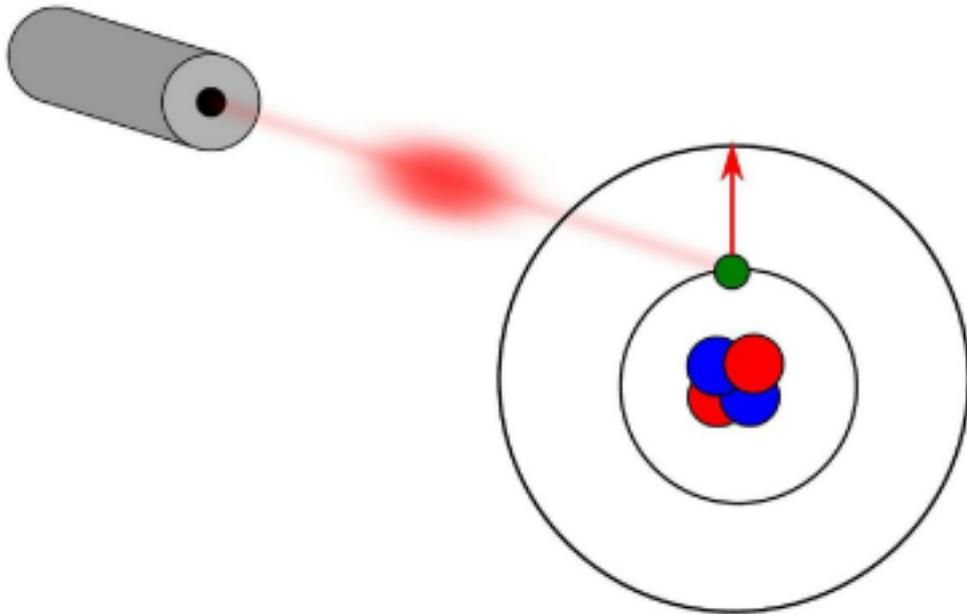


A photon is the elementary particle which carries the electromagnetic force, which includes light, lasers, radio and x-rays. Photons have no mass and no electric charge. Humans can see as little as 5 photons.

## 光子

光子是携带电磁力的最基本粒子,包括光,激光,无线电, X 射线。光子没有质量没有电荷。人类能够看到最低亮度为 5 光子。

# Quantum



Quantum theory best describes the interactions of energy and matter at microscopic scales, like atoms and photons. Through quantum engineering, we are trying to allow these effects to occur at macroscopic (large) scales.

## 量子

量子理论很好的描述了能量和物质在微观层面的相互作用，类似原子和光子。通过量子工程，我们正在努力让这些效果在宏观（大型）层面上发生。

# Relativity



Einstein's theory of relativity states that the effect of gravity is due to a warping of spacetime. The theory has predicted many extraordinary things such as black holes, gravity waves and wormholes.

## 相对论

爱因斯坦的相对论讲述了时空扭曲导致引力效果。相对论预言了许多奇特的事物，比方黑洞，引力波和虫洞。

# String theory

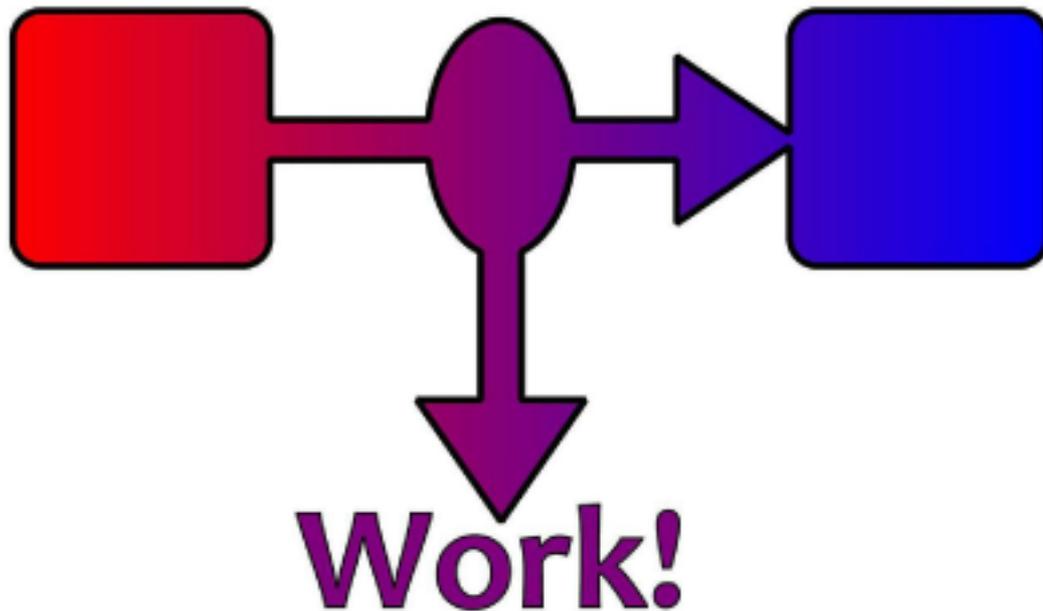


String theory is a candidate "theory of everything" which combines quantum theory with relativity. It replaces the idea of particles (protons, electrons, etc.) with vibrating strings.

## 弦论

弦论结合了量子理论和相对论，是“大一统”理论的候选者。弦论用振动的弦线模型取代粒子模型（质子、电子等）。

# Thermodynamics

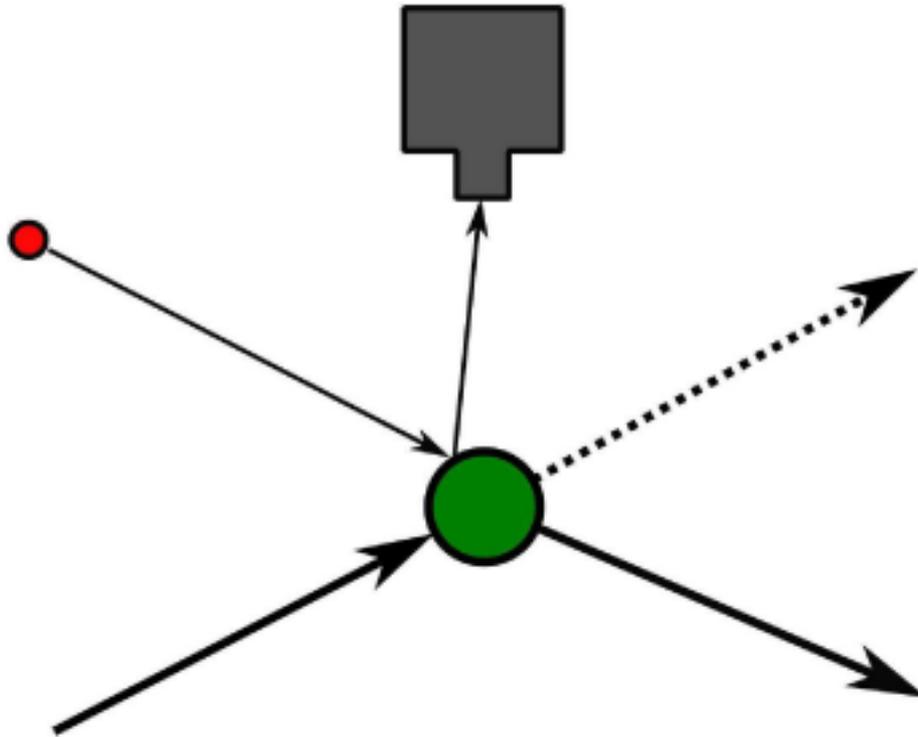


Thermodynamics is the study of how heat and temperature are related to energy and how we can use energy to do work for us. A famous law of thermodynamics says that heat cannot flow from something cold to something hot.

## 热力学

热力学研究热量和温度如何与能量的相联系，以及我们如何利用能量为我们工作的问题。一个著名的热力学理论认为，热量不能从冷的物体传递到热的物体。

# Uncertainty



Heisenberg's uncertainty principle states that when one property of a system is measured, another property is disturbed. So, we can not know both where a particle is and where it is going.

## 不确定性

海森堡的不确定性原理认为，当测量一个系统的一种属性时，系统的另一种属性同时受到干扰。所以，我们不能知道一个粒子当前的位置，也不知道它将要到达的位置。

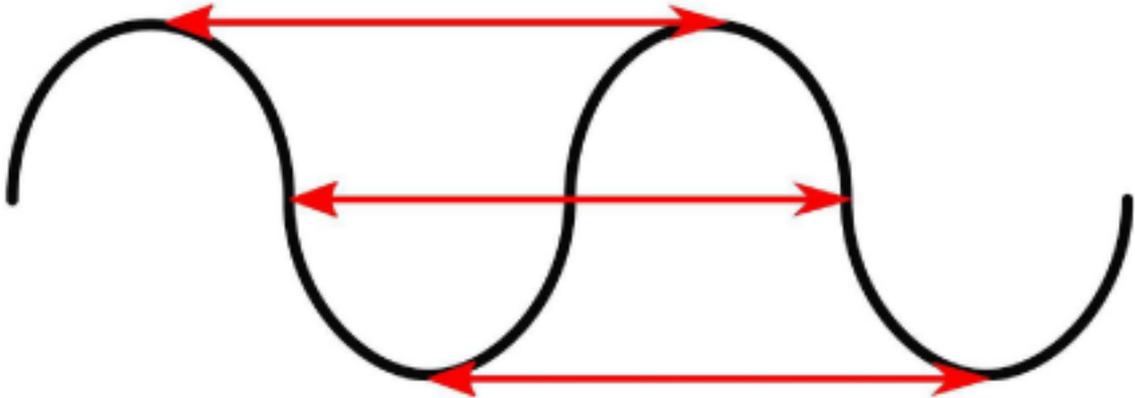
# Vacuum

Vacuum is a space that has nothing in it. Even outer space has some particles floating around. The idea of vacuum is useful for thinking about what would happen in ideal conditions to carry out experiments.

## 真空

真空是一种没有任何物质的空间。即使在太空中，也还有粒子自由漂浮。真空的概念有助于思考在理想条件下做实验将会发生什么情况。

# Wavelength

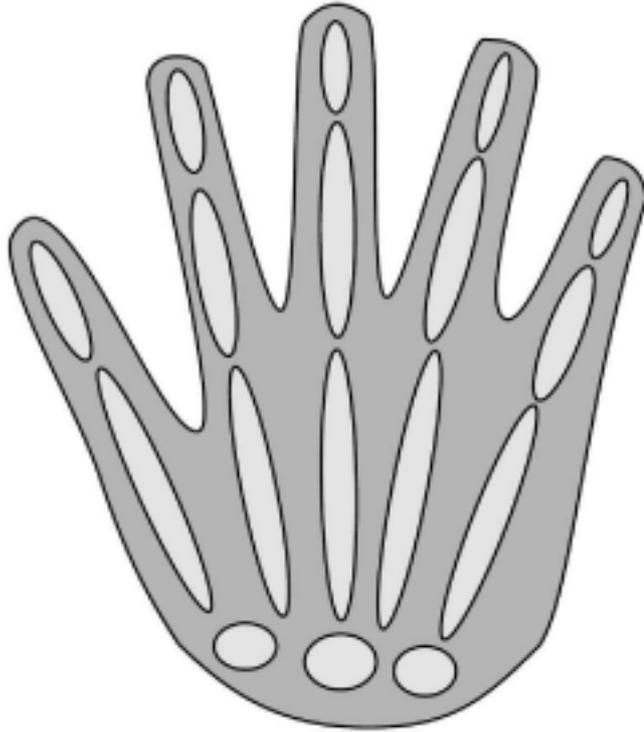


Repeating patterns like ripples in water or vibrations on a string are called waves. The distance over which the pattern repeats is called the wavelength. We can hear sound waves in air with wavelengths as little as 1 inch.

## 波长

类似水中的波浪或者绳子上的振动，这种不断重复的模式被称作波。模式重复的距离被称为波长。我们能够听到的在空气中的声波，它的波长最短是 1 英寸。

# X-ray

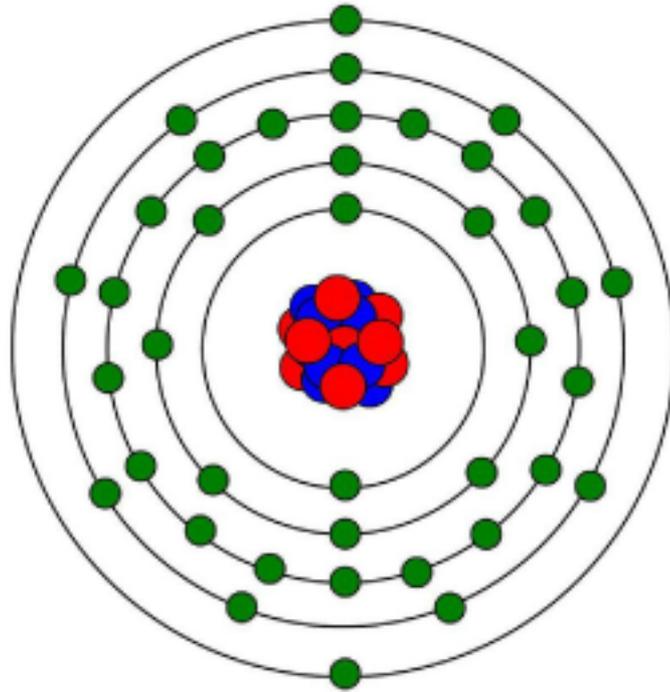


X-ray radiation is high energy light which we can not see. X-rays have a very short wavelength and can go through our skin but not our bones. This makes them useful for medicine and security.

# X-射线

X 射线是我们不能看到的高能量的光。X 射线有很短的波长，能够穿过我们的皮肤但是不能通过我们的骨骼。这对医疗和安检很有帮助。

# Yttrium

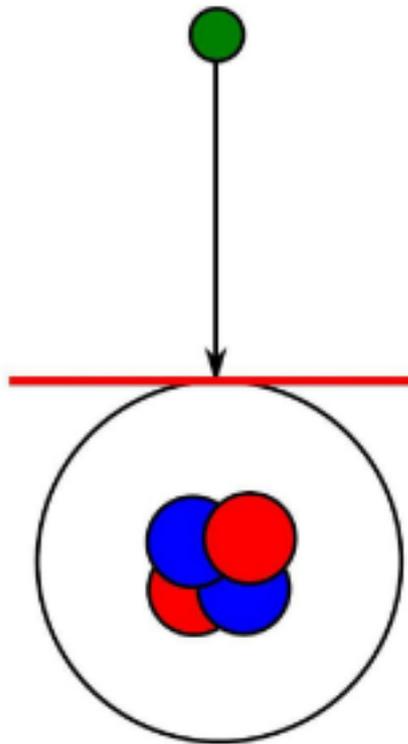


Yttrium is one of the many elements. There is one element for every number of protons in the nucleus. Yttrium has 39 protons and so is recognized in the periodic table by the number 39 or the symbol "Y".

## 钇

钇是许多元素的其中一种。同一种元素的原子核中的质子数量相同。钇有 39 个质子，所以在元素周期表中列在第 39 位，或者符号“Y”。

# Zero-point



Before quantum theory, it was thought that things could have zero energy. But quantum theory predicts that the lowest possible energy of any thing is not zero. This amount of energy is called the zero-point energy.

## 零点能量

在量子理论之前,人们认为物质可以有零能量。但是量子理论预知任何物质的最小可能能量不是零。这最小可能的能量被称为零点能量。