

Physics Time-Line 585BC to 2000

Philip Gibbs (compiled 1995-2000)

From the Greek philosophers to string theorists, this is the chronology of discoveries in physics and cosmology. According to Legend, Archimedes discovered the principle of buoyancy while taking a bath. He jumped out and ran through the streets shouting "Eureka!" The scientific revolution took off 1800 years later after Gutenberg introduced the printing press in Europe and Copernicus broke the old cosmology and put humans in their place away from the centre of the universe. Since then, thousands of scientists have experienced that Eureka moment when they realised that they have seen a fundamental truth not known before.

These pages contain, in chronological order, a selective list of those discoveries from natural philosophy. These are the findings which have helped us understand the laws of physics, the universe and our place in it. The time-line is not yet complete and many more scientists will have the privilege of contributing to its future. Today the internet is taking over from print as the primary means of communicating scientific discoveries and anyone who wants to can participate.

- 585: Thales of Miletus, prediction of an eclipse
- 580: Thales of Miletus, birth of scientific thought
- 580: Thales of Miletus, water as the basic element
- 580: Thales of Miletus, magnets and attraction to rubbed amber
- 560: Thales of Miletus, first cosmologies
- 550: Anaximenes, flat Earth
- 525: Pythagoras, understanding the world and mathematics
- 520: Anaximander, Earth surface is curved (cylinder)
- 515: Parmenides, paradoxes of change and motion
- 500: Pythagoreans, Earth is a sphere
- 480: Oenopides, finds angle of Earth's tilt to ecliptic
- 480: Protagoras, reality comes from the senses
- 480: Heraclitus, fire as primary substance
- 480: Heraclitus, change is the essence of being
- 475: Parmenides, Earth is a sphere
- 470: Anaxagoras, materials are made of "seeds" (atoms)
- 470: Anaxagoras, sun, moon and stars are made of same material as Earth
- 470: Anaxagoras, sun as a hot glowing rock
- 460: Eudoxus, Celestial spheres
- 460: Empedocles, Four elements: Earth, Air, Fire and Water
- 455: Philolaus, Earth Rotates
- 450: Zeno, paradoxes of discrete or continuous space and time
- 445: Leucippus, indivisible atoms
- 425: Democritus, Atomic theory
- 390: Plato, theory of knowledge
- 390: Plato, ether as a fifth element
- 385: Democritus, Milky Way is composed of many stars
- 370: Aristotle, Free falling bodies accelerate but heavier bodies fall faster
- 360: Heracleides, Venus and Mercury orbit the sun

-352: Chinese, recorded observation of a supernova
-350: Heracleides, Rotation of the Earth
-340: Aristotle, Earth is a sphere
-340: Aristotle, Space is continuous and always filled with matter
-335: Kiddyinu, precession of equinoxes
-335: Strato, experiments with falling bodies and levers
-330: Aristotle, physics and metaphysics
-330: Aristotle, geocentric cosmology
-325: Pytheas, tides are caused by moon
-306: Epicurus, support for atomic theory
-295: Euclid, elements of mathematics
-265: Zou Yan, five elements: water, metal, wood, fire and earth
-260: Aristarchus of Samos, ratio of Earth-Sun distance to Earth-Moon distance from angle at half moon
-260: Aristarchus of Samos, distance and size of moon from Earth's shadow during lunar eclipse
-260: Aristarchus of Samos, heliocentric cosmology
-250: Chinese, free bodies move at constant velocity
-240: Archimedes, Principle of levers and compound pulley
-240: Archimedes, Archimedes' principle of hydrostatics
-235: Eratosthenes, Measurement of Earth's circumference
-190: Seleucus, further support for heliocentric theory
-170: Chinese, record of sun spots
-150: Hipparchus, precession of the equinoxes
-130: Hipparchus, size of moon from parallax of eclipse
83: Chinese, loadstone compass
100: Bhaskara, diameter of the Sun
100: Hero of Alexandria, expansion of air with heat
100: Hero of Alexandria, laws of light reflection
130: Ptolemy, geocentric cosmology of epicycles
180: Egypt, alchemy
550: Johannas Philoponus, impetus keeps a body moving
721: Abu Hayyan, preparation of chemicals such as nitric acid
890: Al-Razi, atomic of matter and space
890: Al-Razi, Andromeda galaxy
1000: Ali Al-hazen, reflection, refraction and lenses
1000: Ali Al-hazen, pinhole camera to demonstrate that light travels in straight lines to the eye
1054: China and Arabia Supernova of Crab Nebula recorded
1121: Al-khazini gravity acts towards centre of Earth
1155: Bhaskara first description of a perpetual motion machine
1225: Jordanus Nemorarius, mechanics of lever and composition of motion
1250: Albertus Magnus, isolation of arsenic
1260: Roger Bacon, empiricism
1267: Roger Bacon, magnifying lens
1269: Pierre de Maricourt, experiments with magnets and compass
1304: Theodoric of Freibourg, experiments to investigate rainbows
1320: William of Occam, Occam's Razor
1355: Jean Buridan, physics of impetus
1440: Nicolas Cusanus, Earth is in motion
1440: Nicolas Cusanus, infinite universe
1450: Johann Gutenberg, first printing press in Europe
1472: Johannes Regiomontanus, observation of Halley's Comet

1480: Leonardo de Vinci, description of parachute
1480: Leonardo de Vinci, compares reflection of light to reflection of sound waves
1490: Leonardo de Vinci, capillary action
1492: Leonardo de Vinci, foresees flying machines
1494: Leonardo de Vinci, foresees pendulum clock
1514: Nicolaus Copernicus, writes about heliocentric theory but does not yet publish
1515: Leonardo Da Vinci, progress in mechanics, aerodynamics and hydraulics
1537: Niccolo Tartaglia, trajectory of a bullet
1551: Girolamo Cardano, studies of falling bodies
1553: Giambattista Benedetti, proposed equality of fall rates
1543: Nicolaus Copernicus, heliocentric theory published
1546: Gerardus Mercator, Magnetic pole of Earth
1572: Tycho Brahe, witnesses a supernova and cites it as evidence that the heavens are not changeless
1574: Tycho Brahe, Observes that a comet is beyond the moon
1576: Tycho Brahe, constructs a planetary observatory
1576: Thomas Digges, illustration of an infinite universe surrounding a Copernican solar system
1577: Tycho Brahe, observes that a comet passes through the orbits of other planets
1581: Galileo Galilei, constancy of period of pendulum
1581: Robert Norman, dip of compass shows that Earth is a magnet
1584: Giordano Bruno, suggests that stars are suns with other Earth's in orbit
1585: Giovanni Benedetti, impetus theory is better than Aristotle's physics
1585: Simon Stevin, law of equilibrium
1586: Simon Stevin, pressure in column of liquid
1586: Simon Stevin, verification of equality of fall rates
1589: Galileo Galilei, showed that objects fall at the same rate independent of mass
1592: Galileo Galilei, suggests that physical laws of the heavens are the same as those on Earth
1592: Galileo Galilei, primitive thermometer
1593: Johannes Kepler, related planets to platonic solids
1596: David Fabricius, observes a variable star, (Mira Ceta)
1600: Galileo Galilei, study of sound and vibrating strings
1600: William Gilbert, static electricity and magnetism
1604: Johannes Kepler, mirrors, lenses and vision
1604: Galileo Galilei, distance for falling object increases as square of time
1608: Hans Lippershey, optical telescope
1609: Lippershey and Janssen, the compound microscope
1609: Johannes Kepler, 1st and 2nd laws of planetary motion
1609: Thomas Harriot, maps moon using a telescope
1609: Johannes Kepler, notion of energy
1609: Galileo Galilei, builds a telescope
1610: Galileo Galilei, observes the phases of Venus
1610: Galileo Galilei, observes moons of Jupiter
1610: Galileo Galilei, observes craters on the moon
1610: Galileo Galilei, observes stars in the Milky Way
1610: Galileo Galilei, observes structures around Saturn
1611: Fabricius, Galileo, Harriot, Scheiner, sunspots
1611: Marco de Dominis, explanation of rainbows
1611: Johannes Kepler, principles of the astronomical telescope
1612: Simon Marius, Andromeda galaxy
1612: Galileo Galilei, hydrostatics
1613: Galileo Galilei, principle of inertia

1615: S. de Caus, forces and work
1618: Francesco Grimaldi, interference and diffraction of light
1619: Johannes Kepler, 3rd law of planetary motion
1619: Johannes Kepler, explains why a comets tail points away from the Sun
1619: Rene Descartes, vision of rationalism
1620: Francis Bacon, the empirical scientific method
1620: Francis Bacon, heat is motion
1620: Jan Baptista van Helmont, introduces the word "gas"
1621: Willebrod Snell, the sine law of refraction
1624: Galileo Galilei, theory of tides
1626: Godfried Wendilin, verification of Kepler's laws for moons of Jupiter
1630: Cabaeus, attraction and repulsion of electric charges
1631: Pierre Gassendi, observes a transit of Mercury
1632: Galileo Galilei, Galilean relativity
1632: Galileo Galilei, Support for Copernicus' heliocentric theory
1632: John Ray, water thermometer
1636: G. Pers de Roberval, gravitational forces are mutual attraction
1636: Marin Mersenne, speed of sound
1637: Rene Descartes, inertia, mechanistic physics
1637: Rene Descartes, refraction, rainbow and clouds
1638: Galileo Galilei, motion and friction
1639: Jeremiah Horrocks, observes a transit of Venus
1640: Evangelista Torricelli, theory of hydrodynamics
1641: Ferdinand II, sealed thermometer
1642: Blaise Pascal, mechanical calculator
1644: Evangelista Torricelli, mercury barometer and artificial vacuum
1645: Ismael Boulliau, inverse square law for central force acting on planets
1648: Blaise Pascal, explains barometer as a result of atmospheric pressure
1650: Otto von Guericke, demonstration of the power of vacuum using two large hemispheres and 8 horses
1654: Ferdinand II, sealed thermometer
1656: Christiaan Huygens, rings and moons of Saturn
1657: Christiaan Huygens, pendulum clock
1657: Pierre Fermat, Fermat's principle in optics
1659: Christiaan Huygens, surface features on Mars
1660: Otto von Guericke, electrostatic machine
1660: Robert Boyle, sound will not travel in a vacuum
1661: Robert Boyle, corpuscular theory of matter
1661: Robert Boyle, chemical elements, acids and alkalis
1662: Robert Boyle, Boyle's law for ideal gases relating volume to pressure
1663: Blaise Pascal, isotropy of pressure
1663: James Gregory, describes a reflecting telescope
1663: Huygens, Wallace and Wren, laws of elastic collisions
1664: Robert Hooke, the great red spot of Jupiter
1664: Rene Descartes, published support for Copernican theory

Isaac Newton 1665: Isaac Newton, studies the principles of mechanics and gravity, mass and force
1665: Giovanni Cassini, rotation periods of Jupiter, Mars and Venus
1665: Francesco Grimaldi, his wave theory of light is published
1665: Hooke, Huygens, colours of oil film explained by wave theory of light and interference
1665: Robert Hooke, studies with a microscope

1665: Robert Boyle, air is necessary for candles to burn
1666: Robert Boyle, fluid experiments
1666: Isaac Newton, studies spectrum of light
1666: Isaac Newton, begins work on laws of mechanics and gravitation
1667: Jean Picard, observes anomalies in star positions which are later explained as aberration
1668: John Wallis, conservation of momentum
1668: Isaac Newton, reflecting telescope
1669: Erasmus Bartholin, describes double refraction caused by polarisation effects of Iceland feldspar
1669: Hennig Brand, element phosphorus
1669: Gottfried Leibniz, first concepts of action
1670: Robert Boyle, produces hydrogen by reacting metals with acid
1671: Giovanni Cassini, accurate measurement of distance to Mars and scale of solar system
1672: Jean Richer, the period of a pendulum varies with latitude
1672: Isaac Newton, variation of pendulum is due to equatorial bulge
1673: Ignace Pardies, wave explanation for refraction of light
1673: Christiaan Huygens, laws of centripetal force
1674: Robert Hooke, attempt to explain planetary motion as a balance of centrifugal force and gravitational attraction
1675: Giovanni Cassini, Saturn has separated rings which must be composed of small objects
1675: Isaac Newton, delivers his theory of light
1676: Olaus Roemer, measured the speed of light by observing Jupiter's moons
1676: Robert Hooke, law of elasticity and springs
1676: Edme Mariotte, pressure is inversely proportional to volume (Boyle's law) and height of atmosphere
1678: Robert Hooke, inverse square law of gravity
1678: Christiaan Huygens, writes about wave theory of light
1679: Christiaan Huygens, polarisation of light
1680: Isaac Newton, demonstrates that inverse square law implies elliptical orbits
1684: Isaac Newton, inverse square law and mass dependence of gravity
1684: Gottfried Leibniz, differential calculus
1687: Isaac Newton, publishes laws of motion and gravitation
1687: Isaac Newton, publishes analysis of sound propagation
1688: P. Varignon, addition of forces
1690: Christiaan Huygens, principle of Huygens, secondary waves
1690: John Locke, knowledge comes only from experience and sensations
1692: Richard Bentley, why do stars not fall together under gravitation?
1702: Francis Hauksbee, rarefied air glows during electrical discharge
1704: Isaac Newton, publishes corpuscular theory of light and colour
1705: Edmund Halley, noticed that three previous comets are the same and predicts its return in 1758
1709: Gabriel Fahrenheit, alcohol thermometer
1710: George Berkeley, idealist philosophy against materialist
1714: Gottfried Leibniz, energy conservation
1714: Gottfried Leibniz, rejection of absolute space and time
1714: Gabriel Fahrenheit, mercury thermometer
1718: Edmund Halley, measures proper motion of stars
1720: Edmund Halley, early form of Olbers' paradox
1721: George Berkeley, space exists because of matter in it
1724: Gabriel Fahrenheit, supercooling of water
1727: Stephen Hales, makes oxygen

1728: James Bradley, speed of light and stellar aberration
1729: Stephen Gray, conduction of electricity
1731: Rene Reaumur, alcohol/water thermometer
1733: Charles Du Fay, recognises distinction between positive and negative electric charge
1735: Antonio de Ulloa, element platinum
1736: Leonhard Euler, differential equations in mechanics
1738: Daniel Bernoulli, kinetic theory of gas
1738: Daniel Bernoulli, hydrodynamics
1739: Georg Brandt, element cobalt
1740: Pierre Bouguer, gravitational anomalies
1742: Anders Celsius, reverse centigrade temperature scale
1743: Jean Christin, Celsius temperature scale
1743: Jean d'Alembert, energy in Newtonian mechanics
1744: Pierre de Maupertuis, principle of least action
1744: Jean d'Alembert, theory of fluid dynamics
1744: Leonhard Euler, Euler-Lagrange equations
1744: Mikhail Lomonosov, heat is a form of motion
1745: von Kleist, van Musschenbroek, Leyden jar for electric charge storage
1746: Andreas Marggraf, rediscovery of element zinc
1746: Leonhard Euler, wave theory of light refraction and dispersion
1747: d'Alembert, Euler, solution of equations for vibrating string
1748: Mikhail Lomonosov, conservation of mass and energy
1749: Thomas Melvill, early spectroscopy and yellow line of sodium in salt
1750: Benjamin Franklin, theory of electricity and lightning
1750: John Michell, magnetic induction
1750: John Michell, inverse square law for magnetic fields
1750: Thomas Wright, Milky Way could be due to slab like distribution of stars
1751: Benjamin Franklin, electricity can magnetise needles
1751: Frederik Cronstedt, element nickel
1752: Jean d'Alembert, viscosity
1754: Joseph Black, discovery of carbon dioxide showing that there are gases other than air
1755: Immanuel Kant, theory that the universe formed from a spinning nebula in an infinite hierarchy
1756: William Cullen, evaporation causes cooling
1756: Mikhail Lomonosov, supports wave theory of light
1761: Joseph Black, discovery and measurements of latent and specific heats
1761: John Harrison, portable chronometer
1765: Leonhard Euler, rigid body motions
1766: Joseph Priestley, inverse square law for electric charge
1766: Henry Cavendish, hydrogen is an element
1771: Luigi Galvani, electricity in animals
1772: Carl Scheele, saw air as two gases one of which encouraged combustion
1772: Daniel Rutherford, nitrogen
1772: Antoine Lavoisier, conservation of mass in chemical reactions
1772: Joseph Lagrange, theory of Lagrange points
1774: Priestley, Scheele, element oxygen
1774: Nevil Maskelyne, gravitational deflection of plumb line by a mountain
1774: Carl Scheele, element chlorine
1774: Johann Gahn, element manganese
1775: Alessandro Volta, electrical condenser
1776: Pierre-Simon Laplace, deterministic causality

1777: Antoine Lavoisier, composition of air and burning as a chemical reaction
1779: Charles Augustin de Coulomb, Coulomb's law of friction
1781: Immanuel Kant, Critique of pure reason
1781: William Herschel, discovery of Uranus
1781: Carl Scheele, element molybdenum in ore
1781: Charles Messier, catalogue of nebulae
1781: Heinrich Olbers, Uranus is a planet, not a comet
1782: Jacob Hjelm, isolation of element molybdenum
1782: Franz von Reichstein, element tellurium in ores
1782: William Herschel, catalog of double stars
1782: William Herschel, sun's motion through space
1783: John Michell, Newtonian black hole
1783: Fausto and Juan José de Elhuyar, element tungsten
1783: Rene Hauy, nature of crystals
1784: Henry Cavendish, water is a compound of oxygen and hydrogen
1784: Pierre Laplace, electrostatic potential
1785: Charles Augustin de Coulomb, electric force proportional to product of charges and inverse square of distance
1786: Antoine Lavoisier, distinction between elements and compounds
1787: Antoine Lavoisier, system for naming chemicals
1787: Jacques-Alexander Charles, law of gas expansion with temperature
1788: Joseph Lagrange, Lagrangian mechanics
1788: John Hunter, Diffusion of heat
1789: Antoine Lavoisier, Conservation of mass in chemical reactions
1789: Martin Klaproth, elements zirconium and uranium in compounds
1790: Definition of metric system in France
1790: Adair Crawford, element strontium in compounds
1791: William Gregor, element titanium in compounds
1794: Johann Gadolin, element yttrium in compounds
1794: Pierre Laplace, analysis of Newtonian black hole
1796: Alessandro Volta, chemical batteries and voltage
1797: Henry Cavendish, measured the gravitational constant with a torsion balance
1797: Nicholas Vauquelin, element beryllium identified in gem stones
1797: Nicholas Vauquelin, element chromium
1798: Benjamin Thompson, heat generated equals work done
1798: M. Klaproth, isolation of element tellurium
1798: Humphry Davy, Transmission of heat through vacuum
1798: Benjamin Rumford, experimental relation between work done and heat generated
1800: William Herschel, infrared rays from the Sun
1801: Johann Ritter, Ultraviolet rays
1801: Johann von Soldner, predicted Newtonian bending of light by sun
1801: Giuseppe Piazzi, first asteroid Ceres
1801: Humphry Davy, Electric arc
1801: Andres Manuel del Rio, compounds of element vanadium
1801: Charles Hatchett, element niobium in ores
1802: Heinrich Olbers, second asteroid Pallas
1802: Anders Ekeberg, element tantalum
1802: William Wollaston, dark lines in solar spectrum
1802: William Herschel, double stars are bodies in mutual orbit
1802: Thomas Young, interference and wave description of light
1802: Humphry Davy, Electrochemistry

1802: Joseph Gay-Lussac, Relation of Volume to Temperature of gases at fixed pressure
1803: William Wollaston, elements rhodium and palladium
1803: Smithson Tennant, elements osmium and iridium
1804: John Dalton, Law of partial pressures, Dalton's law
1807: Humphry Davy, isolation of elements sodium and potassium
1808: Humphry Davy, isolation of elements magnesium, strontium, barium and calcium
1808: Davy, Gay-Lussac and Thenard, isolation of element boron
1808: Joseph Gay-Lussac, Law of gas volumes in chemical reactions
1808: John Dalton, atomic theory of chemical reactions
1808: Etienne Malus, polarisation of reflected light
1809: Simeon-Denis Poisson, Poisson brackets in mechanics
1811: Amedeo Avogadro, molecular theory of gases and Avogadro's law
1811: Jean-Baptiste Fourier, harmonic analysis
1811: Bernard Courtois, element iodine
1812: David Brewster, behaviour of polarised light
1814: Joseph von Fraunhofer, spectroscopy
1815: William Prout, atomic weights of elements are multiples of that for hydrogen
1815: Augustin Fresnel, theory of light diffraction
1816: Joseph von Fraunhofer, absorption lines in sun's spectrum
1817: Young and Fresnel, transverse nature of light
1817: Johan Arfvedson, element lithium
1817: Friedrich Strohmeyer, element cadmium
1817: Jöakim Berzelius, element selenium
1818: Augustin Fresnel, ether as absolute rest frame
1819: Dulong and Petit, relation of specific heats to atomic weight in 12 solid elements
1820: Andre Ampere, force on an electric current in a magnetic field
1820: Hans Christian Oersted, an electric current deflects a magnetised needle
1820: Biot and Savart, force law between an electric current and a magnetic field
1821: Thomas Seebeck, thermocouple and thermoelectricity
1821: Joseph von Fraunhofer, diffraction grating

Michael Faraday 1821: Michael Faraday, plotted the magnetic field around a conductor

1821: Michael Faraday, first electric motor
1822: Andre Ampere, two wires with electric currents attract
1822: Charles Babbage, a prototype calculating machine
1822: Mary Mantell, first dinosaur fossil
1823: Michael Faraday, liquefies chlorine
1823: John William Herschel, suggests identification of chemical composition from spectrum
1823: William Sturgeon, electromagnets
1823: Heinrich Olbers, why is the sky dark?
1823: Johann Schweigger, galvanometer
1824: Sadi Carnot, Heat transfer goes from hot body to cold body
1824: Jöakim Berzelius, element silicon
1824: Jöakim Berzelius, isolation of element zirconium
1825: Hans Christian Oersted, isolation of element aluminium
1826: Antoine-J. Balard, element bromine
1827: Georg Ohm, electrical resistance and Ohm's law
1827: Robert Brown, Brownian motion
1828: Friedrich Wohler, isolation of element yttrium
1829: Johann Wolfgang, triads of chemical elements
1829: Thomas Graham, gas diffusion law

1829: Jons Berzelius, element thorium
1830: Charles Lyell, proposition that Earth is several million years old
1830: Nils Sefstrom, rediscovery and naming of vanadium
1831: Michael Faraday, a moving magnet induces an electric current
1831: Michael Faraday, magnetic lines of force
1831: Michael Faraday, the electric dynamo
1831: Michael Faraday, the electric transformer
1833: Michael Faraday, laws of electrolysis
1833: Joseph Henry, self-inductance
1834: Emile Clapeyron, entropy
1834: John Scott Russell, observed solitary waves in a canal
1834: William Hamilton, Principle of least action and Hamiltonian mechanics
1834: Heinrich Lenz, Law of electromagnetic forces
1835: Gustav-Gaspard Coriolis, Coriolis force
1838: Bessel, Henderson, Struve, first measurements of distance to a star by parallax
1839: Karl Mosander, Lanthanum
1840: Rive Marcet anomalous specific heat of diamond
1840: Joule and Helmholtz electricity is a form of energy
1840: Auguste Comte suggests that nature and composition of stars will never be known
1841: Eugene-Melchoir Peligot isolation of element uranium
1842: Christian Doppler theory of Doppler Effect for sound and light
1842: Justin von Mayer Conservation of heat and mechanical energy
1843: James Joule mechanical and electrical equivalent of heat
1843: Howard Aiken first mechanical programmable calculator
1844: Kark Klaus element 44, ruthenium
1845: Michael Faraday, rotation of polarised light by magnetism
1845: Christopher Buys-Ballet, confirmation of Doppler effect for sound using trumpeters on a train
1846: Adams, Le Verrier, predicted position of Neptune
1846: Gustav Kirchhoff, Kirchhoff's laws of electrical networks
1846: William Thomson (Kelvin), Incorrectly estimates Earth to be 100 million years old by heat
1846: Jahanne Galle, Neptune
1847: Hermann von Helmholtz, conservation of energy in Newtonian mechanics and gravity
1848: William Thomson (Kelvin), absolute temperature scale
1848: James Joule average velocity of gas molecules from kinetic theory
1849: Armand Fizeau first accurate measurement of the velocity of light in the laboratory using a toothed wheel
1850: Rudolf Clausius, generalised second law of thermodynamics
1850: Jean Foucault, light travels slower in water than in air
1850: Michael Faraday, experiments to find link between gravity and electromagnetism fail
1851: William Thomson (Lord Kelvin), dynamical theory of heat
1851: William Thomson (Lord Kelvin), absolute zero temperature
1851: Armand Fizeau, velocity of light in moving medium
1851: Franz Neumann, laws of electric-magnetic induction
1851: Jean Foucault, demonstrates rotation of Earth with a pendulum
1852: Jean Foucault, first gyroscope
1852: Joule, Thomson, an expanding gas cools
1853: Anders Angstrom, measured hydrogen spectral lines
1854: Hermann von Helmholtz, Heat death of the universe
1854: Bernhard Riemann, possibility of space curvature on small or large scales
1854: George Airy, Estimate of Earth mass from underground gravity
1855: William Parsons, spiral galaxies

1855: James Clerk Maxwell, mathematics of Faraday's lines of force
1857: James Clerk Maxwell, nature of Saturn's rings
1858: Wallace and Darwin, natural selection of species
1858: Balfour Stewart, conjecture equivalent to Kirchoff's law
1859: Hittorf and Plucker, cathode rays
1859: Bunsen and Kirchoff, measurement of spectral line frequencies
1859: Urbain Le Verrier, anomolous perihelion shift of Mercury
1860: Gustav Kirchoff, Kirchoff's Law and black body problem
1860: Maxwell and Waterston, equipartition theorem of statistical mechanics
1861: von Bunsen, Kirchoff, elements caesium and rubidium found in spectra
1861: William Crookes, element thallium found by its spectra
1861: Johann Madler, Olbers's paradox would be resolved if the universe had a finite age
1862: Anders Angstrom, observed hydrogen in the sun
1863: William Huggins, stellar spectra indicate that stars are made of same elements as found on Earth
1863: Reich, Richter, element indium from its spectra
1864: John Newlands, chemical law of octaves
1864: James Clerk Maxwell, equations of electromagnetic wave propagation in the ether
1865: Rudolf Clausius, introduction of the term entropy
1867: James Clerk Maxwell, statistical physics and thermal equilibrium
1867: Henry Roscoe, isolation of element vanadium
1868: Pierre-Jules Janssen, lines of helium observed in the sun's spectrum
1868: Lockyer, Crookes, element helium recognised and named
1868: William Huggins, Doppler shifts of stellar spectra
1869: Dmitri Mendeleev, periodic table of elements
1871: Dmitri Mendeleev, prediction of new elements such as scandium, germanium, technetium, francium and gallium
1871: Ludwig Boltzmann, classical explanation of Dulong-Petit specific heats
1871: Tyndall and Rayleigh, light scattering and why the sky is blue.
1872: Ludwig Boltzmann, H-theorem
1873: James Clerk Maxwell, electromagnetic nature of light and prediction of radio waves
1873: Johannes van der Waals, intermolecular forces in fluids
1874: George Stoney, estimated the unit of charge and named it the electron
1875: Heinrich Weber, specific heat curves of solids
1875: James Clerk Maxwell, atoms must have a structure
1875: Paul-Emile Lecoq de Boisbaudran, element gallium
1877: Johann Loschmidt, questions validity of second law for time symmetric dynamics
1877: Ludwig Boltzmann, Boltzmann's probability equation for entropy
1877: Asaph Hall, two moons of Mars
1877: Cailletet and Pictet, liquid oxygen and nitrogen
1878: Josiah Willard Gibbs, thermodynamics of chemistry and phase changes
1879: Josef Stefan, empirical discovery of total radiation law, (Stefan's law)
1879: Lars Fredrik Nilson, element scandium
1879: Willaim Crookes, cathode rays may be negatively charged particles
1879: Albert Michelson, improved measurements of the speed of light
1880: Pierre and Jacques Curie, piezoelectricity
1881: Albert Michelson, light interferometer and absence of ether drift
1881: Josiah Willard Gibbs, vector algebra
1883: Ivan Puluy, prior discovery of X-rays
1883: Thomas Edison, thermionic emission
1883: George Fitzgerald, theory of radio transmission

1884: Ludwig Boltzmann, Derivation of Stefan's law for black bodies
1885: Johann Balmer, empirical formula for hydrogen spectral lines
1885: James Dewar, vacuum flask
1886: Henri Moissan, fluorine
1886: Clemens Winkler, element germanium
1887: Heinrich Hertz, transmission, reception and reflection of radio waves
1887: Michelson and Morley, absence of ether drift
1887: Michelson and Morley, fine structure of hydrogen spectrum
1887: Hertz, Hallwachs, photoelectric effect
1887: Woldemar Voigt, anticipated Lorentz transform to derive Doppler shift
1889: George Fitzgerald, length contraction
1889: Roland von Eotvos, torsion balance to test equivalence of inertial and gravitational mass
1890: Johannes Rydberg, empirical formulae for spectral lines and Rydberg constant
1892: Hendrick Lorentz, theory that electricity is due to charged particles
1893: Ernst Mach, influence of all the mass in the universe determines what is natural motion
1893: Wilhelm Wien, derivation of black body displacement law
1893: Oliver Lodge, ether could not be carried along by matter
1894: Rayleigh and Ramsey, element argon
1894: Heinrich Hertz, radio waves travel at speed of light and can be refracted and polarised
1894: James Dewar, liquid oxygen
1894: Pierre Curie, why are there no magnetic monopoles?
1895: , isolation of helium from uranium ore
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