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: Kiddinu, 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: Johannes 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, foresees flying machines
1490: 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
1574: Tycho Brahe, Observes that a comet is beyond the moon
1576: Thomas Digges, illustration of an infinite universe surrounding a Copernican solar system
1581: Galileo Galilei, constancy of period of pendulum
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 Ceti)
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
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: 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: Antione 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, spectroscope
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 Arfwedson, element lithium
1817: Friedrich Strohmeyer, element cadmium
1817: Jöns 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: André Ampère, force on an electric current in a magnetic field
1820: Hans Christian Ørsted, 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: Michael Faraday, plotted the magnetic field around a conductor
1821: Charles Babbage, a prototype calculating machine
1822: Mary Mantell, first dinosaur fossil
1823: Sadi Carnot, Heat transfer goes from hot body to cold body
1823: Jöns Berzelius, isolation of element zirconium
1825: Hans Christian Ørsted, 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 Wöhler, 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: 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, Kirchoff’s laws of electrical networks
1846: William Thomson (Kelvin), Incorrectly estimates Earth to be 100 million years old by heat
1847: Hermann von Helmholtz, conservation of energy in Newtonian mechanics and gravity
1847: 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 Kirchhoff, measurement of spectral line frequencies
1859: Urbain Le Verrier, anomalous perihelion shift of Mercury
1860: Gustav Kirchhoff, Kirchoff's Law and black body problem
1860: Maxwell and Waterston, equipartition theorem of statistical mechanics
1861: von Bunsen, Kirchhoff, 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 Mendeleyev, 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-theoreum
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: William 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: Rolond 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
1895: Wilhelm Roentgen, X-rays
1895: Korteweg and de Vries, Explanation of solitary waves
1895: Jean-Baptiste Perrin, Cathode rays are negative particles
1895: Pierre Curie, loss of magnetism at high temperature, (Curie point)
1895: Hendrick Lorentz, first form of Lorentz transformation
1895: Hendrick Lorentz, Electromagnetic force on a charged particle
1895: Wilhelm Wien, conjectured exponential black body law
1896: Pieter Zeeman, spectral line splitting by magnetic field
1896: Antoine Henri Becquerel, natural radioactivity in uranium ore
1897: Ludwig Boltzmann, time reversal symmetry of electromagnetism
1897: Friedrich Paschen, verification of Wien’s black body law at long wavelengths
1897: Kaufmann, J.J. Thomson, measurement of electron charge to mass ratio by deflection of cathode rays
1897: Weichert, J.J. Thomson, conjectured existence of light electron
1898: James Dewar, liquid hydrogen
1898: Guglielmo Marconi, Transmission of signals across the English Channel
1898: Pierre and Marie Curie, separation of radioactive elements, radium and polonium
1898: Ramsey and Travers, neon, krypton, xenon
1898: Joseph Larmor, complete form of Lorentz transformation
1898: Henri Poincare, questions absolute time and simultaneity
1898: Ernest Rutherford, alpha and beta radiation
1899: Joseph John Thomson, measurement of the charge and mass of the electron
1899: Andre Debierre, element actinium
1899: Max Planck, universal scale of measurement from fundamental constants
1900: Lord Rayleigh, statistical derivation of short wavelength black body law
1900: Ernest Rutherford, first determination of a radioactive half-life
1900: Antoine Henri Becquerel, suggests that beta rays are electrons
1900: Lummer, Pringsheim, Rubens, Kurlbaum, failure of Wien's black body law at short wavelengths
1900: Max Planck, light quanta in black body radiation, Planck's black body law and Planck's constant
1900: Paul Villard, gamma rays
1900: Friedrich Dorn, element 86, radon
1900: Pyotr Lebedev, radiation pressure measured
1901: Max Planck, determination of Planck's constant, Boltzmann's constant, Avogadro's number
1901: and the charge on electron
1901: Guglielmo Marconi, Transmission of Morse signals across the Atlantic
1902: Philipp Lenard, intensity law in photoelectric effect
1902: Rutherford and Soddy, theory of transmutation by radiation and first use of the term "atomic energy"
1902: Kelvin, Thomson, plum pudding model of the atom
1903: Ernest Rutherford, alpha particles have a positive charge
1903: Curie and Laborde, radioactive energy released by radium is large
1903: Johannes Stark, the power of the sun may be due to genesis of chemical elements
1903: Philipp Lenard, model of atom as two separated opposite charges

Albert Einstein 1904: Albert Einstein, energy-frequency relation of light quanta
1904: Hendrik Lorentz, the completed Lorentz transformations
1904: Hantaro Nagaoka, planetary model of the atom
1904: Ambrose Fleming, diode valve and rectifier
1904: Henri Poincare, conjectured light speed as physical limit
1904: Ernest Rutherford, age of Earth by radioactivity dating
1905: Albert Einstein, explains Brownian motion by kinetic theory
1905: Albert Einstein, light-quantum theory for photoelectric law
1905: Albert Einstein, special relativity
1905: Paul Langevin, atomic theory of paramagnetism
1905: Percival Lowell, postulates a ninth planet beyond Neptune
1905: Bragg and Kleeman, alpha-particles have discrete energies
1905: Hermann Nernst, third law of thermodynamics
1905: Albert Einstein, equivalence of mass and energy
1906: Albert Einstein, quantum explanation of specific heat laws for solids
1906: Joseph Thomson, Thomson scattering of X-ray photons and number of electrons in an atom
1906: Ernest Rutherford, alpha particles scatter in air
1906: Lee de Forest, triode valve
1907: Albert Einstein, equivalence principle and gravitational redshift
1907: Urbain and von Welsbach, element 71, lutetium
1908: Hermann Minkowski, geometric unification of space and time
1908: Hans Geiger, Geiger counter for detecting radioactivity
1908: Heike Kammerlingh-Onnes, liquid helium
1908: Geiger, Royds, Rutherford, identify alpha particles as helium nuclei
1909: Albert Einstein, particle-wave duality of photons
1909: Johannes Stark, momentum of photons
1909: Geiger and Marsden, anomalous scattering of alpha particles on gold foil
1909: Robert Millikan, measured the charge on the electron
1910: Albert Einstein, why the sky is blue
1910: Matthew Hunter, isolation of element titanium
1910: Theodor Wulf, excess atmospheric radiation
1911: Victor Hess, high altitude radiation from space
1911: Heike Kammerlingh-Onnes, superconductivity
1911: Ernest Rutherford, Infers the nucleus from the alpha scattering result
1912: Joseph Thomson, mass spectrometry and separation of isotopes
1912: Henrietta Leavitt, period to luminosity relationship for Cepheid variable stars
1912: Robert Millikan, measurement of Planck's constant
1912: Peter Debye, derivation of specific heat laws to low temperatures
1912: Charles Wilson, cloud chamber
1912: Max Von Laue, X-rays are explained as electromagnetic radiation by diffraction
1912: Albert Einstein, curvature of space-time
1912: Vesto Melvin Slipher, observes blue-shift of Andromeda galaxy
1912: Gustav Mie, non-linear field theories
1913: Niels Bohr, quantum theory of atomic orbits
1913: Niels Bohr, radioactivity as nuclear property
1913: Jean-Baptiste Perrin, theory of size of atoms and molecules
1913: Fajans and Gohring, element 91, protactinium
1913: Bragg and Bragg, X-ray diffraction and crystal structure
1913: Hans Geiger, relation of atomic number to nuclear charge
1913: Johannes Stark, splitting of hydrogen spectral lines in electric field
1913: Frederick Soddy, the term "isotope"
1914: James Chadwick, primary beta spectrum is continuous and shows an energy anomaly
1914: Harry Moseley, used X-rays to confirm the correspondence between electric charge of nucleus and atomic number
1914: Einar Hertzsprung, measured distance to Large Magellan Cloud using Cepheid variable stars
1914: Rutherford, da Costa Andrade, gamma rays identified as hard photons
1915: Albert Einstein, general relativity
1915: David Hilbert, action principle for gravitational field equations
1915: Albert Einstein, prediction of light bending and explanation for perihelion shift of mercury
1916: Robert Millikan, verification of energy law in photoelectric effect
1916: Albert Einstein, prediction of gravitational waves
1916: Albert Einstein, conservation of energy-momentum in general relativity
1916: Karl Schwarzschild, singular static solution of gravitational field equations which describes a minimal black hole
1916: Arnold Sommerfeld, Further atomic quantum numbers and fine structure of spectra, fine structure constant
1917: Harlow Shapley, estimates the diameter of the galaxy as 100000 parsecs
1917: Albert Einstein, introduction of the cosmological constant and a steady state model of the universe
1917: Vesto Melvin Slipher, observes that most galaxies have red-shifts
1917: Albert Einstein, theory of stimulated emission and loss of determinism
1917: Willem de Sitter, describes a model of a static universe with no matter
1917: Arthur Eddington, gravitational energy is insufficient to account for the energy output of stars
1917: Rutherford, Marsden, artificial transmutation, hydrogen and oxygen from nitrogen
1918: Harlow Shapley, measured distance to globular clusters using Cepheid variable stars
1918: Harlow Shapley, determined the size and shape of our galaxy
1918: Reissner and Nordstrom, solution of Einstein’s equations which describe a charged black hole
1918: Emmy Noether, The mathematical relationships between symmetry and conservation laws in classical physics
1918: Francis Aston, mass spectrometer
1918: Herman Weyl, gauge theory
1919: Ernest Rutherford, existence of the proton in nucleus
1919: Oliver Lodge, prediction of gravitational lensing
1919: Francis Aston, hydrogen fusion to helium will release a lot of energy
1919: Crommelin, Eddington, verification of Einstein's prediction of starlight deflection during an eclipse
1919: Arthur Eddington, predicts the size of red giants using stellar models
1920: Ernest Rutherford, prediction of neutron
1920: Anderson, Michelson, Pease, size of star Betelgeuse using stellar interferometry
1920: Harkins, Eddington, Fusion of hydrogen could be the energy source of stars
1920: Shapley and Curtis, The Great Debate over the scale and structure of the universe
1921: Theodor Kaluza, unification of electromagnetics and gravity by introducing an extra dimension
1921: Bieler and Chadwick, evidence for a strong nuclear interaction
1921: Charles Bury, measurement of atomic magnetic moments
1921: Bieler and Chadwick, evidence for a strong nuclear interaction
1921: Stern and Gerlach, measurement of atomic magnetic moments
1922: Louis de Broglie, predicts wave nature of particles
1923: Einstein, statistical physics of quantum boson molecular gas
1924: Edward Appleton, ionosphere
1924: Alexander Friedmann, a model of an expanding/oscillating universe with matter included
1924: Edwin Hubble, measured the distance to other galaxies using Cepheid variables proving that they lie outside our own
1925: Robert Millikan, rediscovery of "cosmic rays" in upper atmosphere
1926: Ralph Fowler, suggests that white dwarf stars are explained by the exclusion principle
1926: Paul Dirac, distinction between bosons and fermions, symmetry and anti-symmetry of wave function
1926: Paul Dirac, q-number theory of general quantum mechanics
1926: Enrico Fermi, statistics of electrons
1926: Gilbert Lewis, first use of the term photon
1926: Erwin Schroedinger, the particle wave equation
1926: Erwin Schroedinger, derivation of spectrum of hydrogen atom using the wave equation
1926: Max Born, probability interpretation of wave function
1926: Albert Einstein, "God does not play dice"
1926: Erwin Schroedinger, derivation of spectrum of hydrogen atom by matrix methods
1926: Born, Heisenberg, Jordan, model of a quantised field
1926: Wolfgang Pauli, derivation of spectrum of hydrogen atom by matrix methods
1926: Carol Young, first use of the term photon
1926: Wolfgang Pauli, momentum and position cannot be known simultaneously
1926: Werner Heisenberg, the uncertainty principle
1927: Davisson, Germer, Thomson, verification of electron diffraction by a crystal
1927: Jan Oort, observation of galactic rotation and spiral shape of our galaxy
1927: Niels Bohr, principle of complementarity
1927: Paul Dirac, quantisation of electromagnetic field, bosonic creation and annihilation operators, virtual particles, zero point energy
1927: Eugene Wigner, conservation of parity
1927: Friedrich Hund, quantum tunneling
1927: Heitler and London, quantum theory can explain chemical bonding
1927: Fritz London, electromagnetic gauge is phase of Schroedinger equation
1927: Georges Lemaitre, models of an expanding universe
1927: Niels Bohr, Copenhagen interpretation of Quantum Mechanics
1928: Condon, Gamow, Gurney, alpha emission is due to quantum tunnelling
1928: Paul Dirac, relativistic equation of the spin-half electron
1928: Willem Keeson, phase transition in liquid Helium
1928: Jordan, Pauli, quantum field theory of free fields
1928: Rolf Wideroe, first prototype high energy accelerator
1928: Heisenberg, Weyl, group representation theory in quantum mechanics
1929: quartz crystal clock
1929: Ernest Lawrence, cyclotron
1929: Robert van de Graaff, Van de Graaff generator
1929: Heisenberg, Pauli, interacting quantum field theory and divergences
1929: J. Robert Oppenheimer, divergence of electron self-energy
1929: Paul Dirac, electron sea and hole theory
1929: Edwin Hubble, first measurement of Hubble's constant leading to the conclusion that the Universe is expanding
1929: Bothe, Kolhorster, cosmic rays are charged particles
1930: Clyde Tombaugh, Pluto
1930: Becker, Bothe, observed neutral rays later identified as neutrons
1930: Paul Dirac, systematic canonical quantisation
1930: Arthur Eddington, Einstein's static universe is unstable
1930: Hartree and Fock, multi-particle quantum mechanics
1931: Dirac, Oppenheimer, Weyl, prediction of anti-matter
1931: Albert Einstein, discard cosmological constant, oscillating cosmology
1931: Georges Lemaitre, the primeval atom as origin of the universe
1931: Isidor Rabi, principle of population inversion
1931: Wolfgang Pauli, neutrino as explanation for missing energy and spin in weak nuclear decay
1931: Eugene Wigner, symmetry in quantum mechanics
1931: Paul Dirac, magnetic monopoles can explain quantum of charge
1932: Raman and Bhagavantam, Verification that photon is spin one
1932: Einstein, De Sitter, Flat expanding cosmology
1932: James Chadwick, identified the neutron
1932: Knoll and Ruska, electron microscope
1932: Carl Anderson, positron from cosmic rays
1932: Cockroft and Walton, linear proton accelerators to 700 keV and verification of mass/energy equivalence
1932: Karl Jansky, first radio astronomy
1932: Dmitri Iwanenko, Neutron as a constituent of nucleus
1932: Richard Tolman, thermodynamics of oscillating cyclic universe
1932: Vladimir Fock, Fock space
1932: Urey, Brickwedde, Murphy, Washburn, deuterium
1932: Werner Heisenberg, Nucleus is composed of protons and neutrons
1932: Lev Davidovich Landau, proposed existence of neutron stars
1933: Paul Ehrenfest, theory of second order phase transitions
1933: Blackett and Occhialini, electron-positron creation and annihilation
1933: Esterman, Frisch and Stern, measurement of proton magnetic moment
1933: Baade and Zwicky, collapse of a white dwarf may set off a supernova and leave a neutron star
1933: Fritz Zwicky, dark matter in galactic clusters
1933: Arthur Milne, cosmological principle of large scale homogeneity
1933: Harlow Shapley, observation of structure in galaxy distribution
1934: Pavel Cherenkov, Cherenkov radiation
1934: Chadwick and Goldhaber, precise measurement of neutron mass
1934: Chadwick and Goldhaber, measurement of nuclear force
1934: Francis Perrin, neutrino is massless
1934: Grote Reber, discrete radio source in Cygnus
1934: Joliot and Curie-Joliot, induced radioactivity
1934: Enrico Fermi, Fermi theory of weak interaction and beta decay
1934: Esterman and Stern, magnetic moment of neutron
1934: Fermi and Hahn, fission observed
1934: Paul Dirac, polarisation of the vacuum and more divergence in QED
1935: Yukawa, Stueckelberg, theory of strong nuclear force and the pi-meson
1935: J. Robert Oppenheimer, spin statistics
1935: Enrico Fermi, hypothesis of transuranic elements
1935: Robertson, Walker, most general homogeneous isotropic universe
1935: Einstein, Podolsky, Rosen, EPR Paradox of non-locality in quantum mechanics
1935: Subrahmanyan Chandrasekhar, calculation of mass limit for stellar collapse of a white dwarf star
1935: Erwin Schroedinger, quantum cat paradox
1935: Robert Watson-Watt, radar
1936: Niels Bohr, compound nucleus
1936: Anderson and Neddermeyer, muon in cosmic rays
1936: Leon Brillouin, theory of wave guides
1936: Breit and Coll, isotopic spin
1936: Alan Turing, computability
1937: Pyotr Kapitza, superfluidity of helium II
1937: Perrier and Segre, element 37, technetium, first element made artificially
1937: Majorana, symmetric theory of electron and positron
1937: Julian Schwinger, Neutron spin is half
1937: Blau, Wambacher, photographic emulsion as particle detector
1937: Bloch and Nordsieck, operator normal ordering
1937: John Wheeler, S-matrix theory
1938: Oppenheimer and Serber, there is an upper mass limit for stability of neutron stars
1938: Bethe, Critchfield, von Weizsacker, stars are powered by nuclear fusion CN-cycle
1938: Isador Rabi, Magnetic Resonance
1938: Hahn, Strassman, fission induced with neutrons
1938: Oskar Klein, new field equations from higher dimensional Kaluza-Klein theory
1938: Fritz Zwicky, clusters of galaxies
1938: Ernest Stueckelberg, suggests baryon number conservation
1938: Hendrick Kramers, mass renormalisation
1938: Frisch and Meitner, theory of uranium fission
1939: Joliot and Curie-Joliot, Szilard, theory of nuclear chain reaction
1939: Oppenheimer and Snyder, a collapsing neutron star will form a black hole.
1939: Bohr, Wheeler, Khariton, Zel'dovich ..., theory of U235 fission and chain reaction.
1939: Bloch and Alvarez, measurement of the neutron magnetic moment
1939: Rossi, Van Norman, Hilbery, Muon decay
1939: Teller, Szilard, Einstein, warning letter to Roosevelt
1939: Peierls and Frisch, critical mass and theory of A-Bomb
1939: Marguerite Perey, element 87, francium
1940: MacMillan, Abelson, element 93, neptunium, first transuranian elements
1940: Corson, MacKenzie, Segre, element 85, astatine synthesised
1941: MacMillan, Kennedy, Seaborg, Wahl, element 94, plutonium, second transuranian elements
1941: Lev Davidovich Landau, theory of superfluids
1941: Rossi and Hall, Muon decay used to verify relativistic time dilation
1941: Mckellar and Adams, Cosmic cyanogen observed to be at temperature of CBR, but significance not recognised
1941: "Manhattan Project" is founded to develop atomic bomb
1942: Enrico Fermi, the first self-sustaining fission reaction
1942: Grote Reber, radio map of the sky
1943: Ernest Stueckelberg, renormalisation of QED
1943: Sakata, Inoue, theory of pion decay to muons
1944: Lars Onsager, general theory of phase transitions
1944: Seaborg, James, Morgan, Ghiorso, Thompson, elements 95; americium, 96; curium
1944: Leprince-Ringuet and Lheritier, the K+ found in cosmic rays
1945: Robert Oppenheimer et al, atomic bomb
1946: James Hey, Discovery of radio source Cygnus A
1946: George Gamow, Cold big bang model
1946: Bloch and Purcell, Nuclear magnetic resonance

Richard Feynman 1947: Claude Shannon, information theory
1947: Conversi, Pancini, Piccioni, indication that the muon is not the mediator of the strong force
1947: Hartmut Kallman, scintillation counter
1947: Denis Gabor, theory of holograms
1947: Powell, Occhialini, negative pion found
1947: Willis Lamb, fine structure of hydrogen spectrum, the Lamb shift
1947: Hans Bethe, renormalisation of Lamb shift calculation
1947: Kusch and Folley, measurement of the anomalous magnetic moment of the electron
1947: Hartland Snyder, quantised space-time
1948: Tomonaga, Schwinger, Feynman, renormalisation of QED
1948: Alpher, Bethe and Gamow, explain nucleosynthesis in hot big bang
1948: Alpher and Herman, prediction of cosmic background radiation
1948: Bondi, Gold, Hoyle, steady state theory of the universe
1948: Goldhaber and Goldhaber, experimental proof that beta particles are electrons
1948: Richard Feynman, path integral approach to quantum theory
1948: Bardeen, Brattain, Shockley, semi-conductors and transistors
1948: Snell and Miller, Decay of the neutron
1948: Freeman Dyson, Equivalence of Feynman and Schwinger-Tomonaga QED
1948: Hendrik Casimir, Theory of Casimir force
1949: Leighton, Anderson, Seriff, Muon is spin half
1949: Seaborg, Ghiorso, Thompson, element 97, berkelium
1949: Haxel, Jensen, Mayer, Suess, nuclear shell model
1949: Fred Hoyle, first use of the term "big bang"
1950: Paul Dirac, first suggestion of string theory
1950: Seaborg, Ghiorsos, Street, Thompson, element 98, californium
1950: Jan Oort, theory of comet origins
1950: Bjorklund, Crandall, Moyer, York, Neutral pion
1950: Albert Einstein, Einstein’s failed unified theory
1951: Smith and Baade, identify a radio galaxy
1951: Petermann, Stueckelberg, renormalisation group
1952: Courant, Livingston, Snyder, Strong focusing principle for particle accelerators
1952: Alvarez, Glaser, bubble chamber
1952: Seaborg et al, elements 99; einsteinium, 100; fermium
1952: Walter Baade, resolves confusion over two different types of Cepheid variable stars
1952: Edward Teller et al, hydrogen bomb
1952: Joseph Weber, described the principle of the maser
1953: Gell-Mann and Nishijima, strangeness
1953: Gerard de Vaucouleurs, galaxy superclusters and large scale inhomogeneities
1953: Charles Townes, maser
1953: Alpher, Herman, Follin, first recognition of the horizon problem in cosmology
1954: Yang and Mills, non-abelian gauge theory
1954: Low and Gell-Mann, renormalisation group revisited
1955: caesium atomic clock
1955: Martin Ryle, radio telescope interferometry
1955: John Wheeler, describes the space-time foam at the Planck scale
1955: Ilya Prigogine, thermodynamics of irreversible processes
1955: Carl von Weizsacker, Multiple Quantisation and ur-theory
1955: Seaborg et al, element 101, mendelevium
1955: Chamberlain, Segre and Wiegand anti-proton
1956: Reines and Cowan, neutrino detection
1956: Erwin Muller, field ion microscope and first images of individual atoms
1956: Cook, Lamberton, Piconi, Wentzel, anti-neutron
1956: Abdus Salam, 2-component neutrino
1957: Burbidge, Burbidge, Hoyle, Fowler Formation of light elements in stars
1957: Friedman, Lederman, Telegdi, Wu, parity violation in weak decays
1957: Bardeen, Cooper, Schrieffer, BCS theory of superconductivity
1957: nobelium
1957: Hugh Everett, Many worlds interpretation of quantum mechanics
1957: Feynman, Gell-Mann, Marshak, Sudarshan, V-A theory of weak interactions
1957: John Wheeler, pregeometry and space-time foam
1958: Townes and Schawlow, theory of laser
1958: Martin Ryle, evidence for evolution of distant cosmological radio sources
1958: Seaborg et al, element 102, nobelium
1958: Gary Feinberg, predicts that muon neutrino is distinct from electron neutrino
1958: David Finkelstein, resolves the nature of the black hole event horizon
1959: MIT, radar echo from Venus
1959: Ramsey, Kleppner, Goldenberg, hydrogen maser atomic clock
1959: Tulio Regge, theory of Regge poles
1960: Theodore Maiman, ruby laser
1960: Martin Kruskal, new coordinates to study Schwarzschild black hole
1960: Eugene Wigner, the unreasonable effectiveness of mathematics in natural science
1960: Pound and Rebka, measurement of gravitational red-shift
1960: Matthews and Sandage, optical identification of a quasar
1961: Sheldon Glashow, introduces neutral intermediate boson of electro-weak interactions
1961: Jeoffrey Goldstone, Theory of massless particles in spontaneous symmetry breaking (Goldstone boson)
1961: Gell-Mann and Ne'eman, The eightfold way, SU(3) octet symmetry of hadrons
1961: Robert Dicke, Weak anthropic principle
1961: Robert Hofstadter, nucleons have an internal structure
1961: Ghiorsio, Sikkeland, Larsh, Latimer, element 103, lawrencium
1961: Edward Ohm, prior detection of CMBR, but not identified
1961: Edward Lorenz, chaos theory
1961: Yuri Gagarin, first man in space
1961: Geoffrey Chew, nuclear democracy and the bootstrap model
1961: Tulio Regge, simplicial lattice general relativity
1962: Gell-Mann and Ne'eman, Prediction of Omega minus particle
1962: Leith and Upatnieks, first hologram
1962: Giaconi, Gursky, Paolini, Rossi, detection of cosmic X-rays
1962: Brian Josephson, theory of Josephson effect
1962: Lederman, Steinberger, Schwartz, evidence for more than one type of neutrino
1962: Hogarth, proposes relation between cosmological and thermodynamic arrows of time
1962: Thomas Gold, time-symmetric universe
1962: Benoit Mandelbrot, fractal images
1963: Samios et al, Baryon Omega minus found
1963: Philip Anderson, Gauge theories can evade Goldstone theorem
1963: Roy Kerr, solution for a rotating black hole
1963: Schmidt, Greensite, Sandage, quasars are distant
1963: Nicola Cabibbo, weak mixing angle
1964: Brout, Englert, Higgs, Higgs mechanism of symmetry breaking
1964: Hoyle, Taylor, Zeldovich, big bang nucleosynthesis of helium
1964: Steven Weinberg, baryon number is probably not conserved
1964: Christenson, Cronin, Fitch, Turlay, CP violation in weak interactions
1964: Gell-Mann, Zweig, quark theory of hadrons
1964: Murray Gell-Mann, current algebra
1964: Bjorken and Glashow, prediciton of SU(4) flavour symmetry and charm
1964: Roger Penrose, black holes must contain singularities
1964: Ginzburg, Doroshkevich, Novikov, Zel'dovich, black holes have no hair
1964: Salpeter and Zel'dovich, black holes power quasars and radio galaxies
1964: John Bell, a quantum inequality which limits the possibilities for local hidden variable theories
1964: John Wheeler, foundations of canonical formulism for gravity
1964: soviets, element 104, rutherfordium
1964: Salam, Ward, SU(2)xU(1) model of electro-weak unification
1965: Thomas Kibble, Higgs mechanism for Yang-Mills theory
1965: Greenberg, Han, Nambu, SU(3) colour symmetry to explain statistics of quark model
1965: Zabusky and Kruskal, Numerical studies of solitons
1965: Penzias and Wilson, detection of the cosmic background radiation
1965: Dicke, Peebles, Roll, Wilkinson, indentification of cosmic background radiation
1965: Rees and Sciama, quasars were more numerable in the past
1966: X-ray source Cygnus X-1 discovered
1967: Steven Weinberg, electro-weak unification
1967: Bell and Hewish, pulsars
1967: Irwin Shapiro, radar measurement of relativistic time delays to Mercury
1967: John Wheeler, introduced the term "black hole"
1967: Andrei Sakharov, three criteria for cosmological abundance of matter over anti-matter
1967: soviets, element 105, dubnium
1968: Joseph Weber, first attempt at a gravitational wave detector
1968: Brandon Carter, Strong anthropic principle
1968: Gabriele Veneziano, Dual resonance model for strong interaction, beginning of string theory
1968: James Bjorken, theory of scaling behavior in deep inelastic scattering
1968: Richard Feynman, scaling and parton model of nucleons
1969: Kendall, Friedman, Taylor Deep inelastic scattering experiments find structure inside protons.
1969: Ellis, Hawking and Penrose, singularity theorems for the big bang
1969: Roger Penrose, conjectures that singularities are hidden by cosmic censorship
1969: Donald Lynden-Bell, black hole at the centre of galactic nuclei
1969: Raymond Davis, solar neutrino detector
1969: Charles Misner, cosmological horizon problem revisited
1969: Robert Dicke, cosmological flatness problem
1969: Neil Armstrong, first man on the moon
1969: first attempts to verify solar deflection of radio waves from quasars
1969: David Finkelstein, Space-time code
1970: Claude Lovelace, Veneziano amplitude has special properties in 26 dimensions
1970: Nambu, Nielsen, Susskind, realisation that the dual resonance model is string theory
1970: Goto, Hara, Nambu, Action for bosonic string as area of world sheet
1970: Simon Van der Meer, stochastic cooling for particle beams
1970: Glashow, Iliopoulos, Maiani, GIM mechanism and prediction of charm quark
1970: Stephen Hawking, the surface area of a black holes event horizon always increases
1971: Kenneth Wilson, the operator product expansion and the renormalisation group for the strong force
1971: Dimopolous, Fayet, Gol'fand, Lichtman Supersymmetry
1971: Ramond, Neveu, Schwarz String theory of bosons and fermions with critical dimension 10
1971: 't Hooft, Veltman, Lee, renormalisation of electro-weak model
1971: Roger Penrose, spin networks
1971: Bolton, Murdin, Webster Cygnus X-1 identified as black hole candidate
1972: Jacob Bekenstein, black hole entropy
1972: Fritsch, Gell-Mann, Bardeen, Quantum Chromodynamics
1972: Kirzhnits, Linde, Electro-Weak phase transition
1972: Roger Penrose, Twistor
1972: Salam, Pati, SU(4)xSU(4) unification and proton decay
1972: Tom Bolton Cygnus X-1 identified as black hole
1973: Wess and Zumino, space-time supersymmetry
1973: Ostriker and Peebles, dark matter in galaxies
1973: CERN, Evidence of weak neutral currents
1973: 't Hooft, Gross, Politzer, Wilczek, Coleman, theory of asymptotic freedom in non-abelian gauge theories
1973: Klebesadel, Strong, Olson, Gamma Ray Bursts are cosmic
1973: Edward Tyron, the universe as a quantum fluctuation
1974: Yoneya, Scherk, Schwarz interpretation of string theory as a theory of gravity
1974: Ting and Richter, found J/psi, charmed quark
1974: Kenneth Wilson, lattice gauge theory
1974: Taylor and Hulse, binary pulsar and relativistic effects
1974: Kobayashi and Maskawa, CKM mixing matrix; CP violation in weak interaction requires three generations
1974: Georgi and Glashow, SU(5) as Grand Unified Theory and prediction of proton decay
1974: Georgi, Weinberg, Quinn, Convergence of coupling constants at GUT scale
1974: 't Hooft, Okun, Polyakov, heavy magnetic monopoles exist in GUTs.

1974: Stephen Hawking, black hole radiation and thermodynamics
1974: soviets and americans, element 106, seaborgium
1975: Martin Perl Tau lepton
1975: Gail Hanson quark jets
1975: Chincarini and Rood lumpiness in galaxy distributions
1975: Unruh and Davies acceleration radiation effect
1975: Mitchell Feigenbaum, universality in chaotic non-linear systems
1975: Belavin, Polyakov, Schwartz, Tyupkin instantons in Yang-Mills theory
1976: Scherk, Gliozzi, Olive Supersymmetric string theory
1976: Deser, Freedman, Van Nieuwenhuizen, Ferrara, Zumino Supergravity
1976: Levine and Vessot precision test of gravitational time dilation on rocket
1976: Gerard 't Hooft the instantons solution of the U(1) anomaly
1976: soviets element 107, bohrium
1977: James Elliot, rings of Uranus
1977: Olive and Montenen, conjecture of electro-magnetic duality
1977: Fermilab, bottom quark
1977: Klaus von Klitzing, quantum Hall effect
1977: Tiffit, Gregory, Joeveer, Einasto, Thompson, clusters chains and voids in galaxy distributions
1977: Berkley, dipole anisotropy on cosmic background radiation
1977: Leon Lederman, upsilon, bottom quark
1977: Gunn, Schramm, Steigman, cosmological constraints imply that there are only three light neutrinos
1978: Charon, moon of Pluto
1978: Taylor and Hulse, evidence for gravitational radiation of binary pulsar
1978: Cremmer, Julia, Nahm, Scherk, 11-dimensional supergravity
1978: Prescott, Taylor, electro-weak effect on electron polarisation
1979: Voyager, rings of Jupiter
1979: John Preskill, cosmological monopole problem
1979: Walsh, Carswell, Weymannquasar doubled by gravitational lensing
1979: DESY, evidence for gluons in hadron Jets
1979: Alexei Starobinsky inflationary universe
1980: Frederick Reines, Evidence of Neutrino oscillations
1980: DESY, measurement of gluon spin
1980: Alan Guth inflationary early universe
1981: Witten, Schoen, Yau positive energy theorem in general relativity
1981: Green and Schwarz, Type I superstring theory
1981: Binnig, Rohrer scanning tunneling electron microscope
1981: Witten and Alvarez-Gaume Difficulty of getting standard model from 11-D supergravity because of chiral modes
1981: Alexander Polyakov Path integral quantisation of strings, conformal symmetry and critical dimension
1981: Linde, Albrecht, Steinhardt new inflationary universe
1982: Green and Schwarz, Type II superstring theory
1982: Alain Aspect an experiment to confirm non-local aspects of quantum theory
1982: Darmstadt element 109, meitnerium
1982: limits on proton lifetime rule out many Grand Unified Theories
1983: Carlo Rubbia et al, W and Z bosons at CERN
1983: Andrei Linde chaotic inflationary universe
1984: Green and Schwarz, anomaly cancellations in superstring theory
1984: Darnstadt element 108, hassium
1985: Gross, Harvey, Martinec, Rohm, heterotic string theory
1985: David Deutsch, theory of quantum computing
1986: Bednorz and Mueller, high temperature superconductivity
1986: Abhay Ashtekar, new variables for canonical quantum gravity
1986: Geller, Huchra, Lapparent, bubble structure of galaxy distributions
1987: supernova 1987a
1987: Masatoshi Koshiba, detection of neutrinos from a supernova
1988: Atiyah, Witten, topological quantum field theories
1988: Smolin and Rovelli, loop representation of quantum gravity
1989: SLAC, evidence that number of light neutrinos is 3 from Z width
1989: Bennett and Brassard, first quantum computer
1990: John Mather, black body spectrum of cosmic background radiation from COBE
1991: CERN, confirmation that number of light neutrinos is 3
1991: Connes, Lott, particle models from non-commutative geometry
1991: BATSE, Gamma Ray Burst distribution is isotropic
1992: Mather and Smoot, angular fluctuations in cosmic background radiation with COBE
1993: Aspinwall, Morrison, Greene, Topology change in string theory
1994: Atiyah, Witten, topological quantum field theories
1994: Smolin and Rovelli, loop representation of quantum gravity
1994: Seiberg and Witten, Electro-magnetic duality in supersymmetric gauge theory
1994: Hubble Space Telescope, Evidence for black hole at the centre of galaxy M87
1994: Peter Shor, factorisation algorithm for a quantum computer
1994: Hull, Townsend, Unity of String Dualities
1994: Darnstadt element 110
1995: Witten, Duff and Townsend, M-Theory
1995: Joseph Polchinski, D-Branes
1995: Cornell, Wieman, Anderson Bose-Einstein condensate of atomic gas
1995: CERN, Creation of Anti-hydrogen atoms
1995: Mayor and Queloz, first extra-solar planet orbiting an ordinary star
1995: Darnstadt element 111
1996: Strominger, Vafa, D-branes and black-holes
1996: Cumrun Vafa, F-theory
1996: Steven Lamoreaux, measurement of Casimir force
1996: Darnstadt element 112
1996: Banks, Fischler, Shenker, Susskind, M-theory as a matrix model
1997: BepoSAX, location of Gamma Ray Bursts demonstrates that they are extragalactic
1997: Juan Maldacena, AdS/CFT duality
1997: SLAC, photon-photon scattering produces electron-positron pairs
1998: Perlmutter, Garnavich et al, supernovae observations suggest that the expansion of the universe is accelerating
1998: Super-Kamiokande, neutrino oscillation demonstrated
1998: CERN, Fermilab, time reversal asymmetry observed for K meson decay
2000: Fermilab, tau neutrino observed