

Early theories of the structure of matter were not based upon experiments. As scientists began to study the relationship between several physical phenomenon such as electricity, and magnetism they began to develop different models about atomic structure.

Welcome to the atomic structure timeline. This site explores discoveries related to atomic structure including the electron, proton and neutron. The dates used for events are open to debate since many scientist's spent decades studying a topic

Year	Scientist(s)	Discovery
Greek era	Democritus	"by convention bitter, by convention sweet, but in reality atoms and void"
1704	Isaac Newton	Proposed a mechanical universe with small solid masses in motion.
1803	John Dalton	Proposed an "atomic theory" with spherical solid atoms based upon measurable properties of mass.
1832	Michael Faraday	Studied the effect of electricity on solutions, coined term "electrolysis" as a splitting of molecules with electricity, developed laws of electrolysis. Faraday himself was not a proponent of atomism.
1859	J. Plucker	Built one of the first gas discharge tubes ("cathode ray tube").
1869	Dmitri Mendeleev	Arranged elements into 7 groups with similar properties. He discovered that the properties of elements "were periodic functions of the their atomic weights". This became known as the Periodic Law.
1873	James Clerk Maxwell	Proposed electric and magnetic fields filled the void.
1874	G.J. Stoney	Proposed that electricity was made of discrete negative particles he called electrons ". (Link to info on electrons)
1879	Sir William Crookes	Discovered cathode rays had the following properties: travel in straight lines from the cathode; cause glass to fluoresce; impart a negative charge to objects they strike; are deflected by electric fields and magnets to suggest a negative charge; cause pinwheels in their path to spin indicating they have mass.
1886	E. Goldstein	Used a CRT to study "canal rays" which had electrical and magnetic properties opposite of an electron.
1895	Wilhelm Roentgen	Using a CRT he observed that nearby chemicals glowed. Further experiments found very penetrating rays coming from the CRT that were not deflected by a magnetic field. He named them "X-rays".
1896	Henri Becquerel	While studying the effect of x-rays on photographic film, he discovered some chemicals spontaneously decompose and give off very penetrating rays.

1897	J.J. Thomson	Used a CRT to experimentally determine the charge to mass ratio (e/m) of an electron = 1.759×10^8 coulombs/gram.
1897	J.J. Thomson	Studied "canal rays" and found they were associated with the proton H^+ .
1898	Rutherford	Studied radiations emitted from uranium and thorium and named them <i>alpha</i> and <i>beta</i> .
1898	Marie Sklodowska Curie	Studied uranium and thorium and called their spontaneous decay process "radioactivity". She and her husband Pierre also discovered the radioactive elements polonium and radium.
1900	Soddy	Observed spontaneous disintegration of radioactive elements into variants he called "isotopes" or totally new elements, discovered "half-life", made initial calculations on energy released during decay.
1900	Max Planck	used the idea of quanta (discrete units of energy) to explain hot glowing matter.
1903	Nagaoka	Postulated a "Saturnian" model of the atom with flat rings of electrons revolving around a positively charged particle.
1904	Abegg	Discovered that inert gases had a stable electron configuration which lead to their chemical inactivity.
1905	Albert Einstein	Published the famous equation $E=mc^2$
1906	Hans Geiger	Developed an electrical device to "click" when hit with alpha particles.
1909	R.A. Millikan	Oil drop experiment determined the charge ($e=1.602 \times 10^{-19}$ coulomb) and the mass ($m = 9.11 \times 10^{-28}$ gram) of an electron.
1911	Ernest Rutherford	Using alpha particles as atomic bullets, probed the atoms in a piece of thin (0.00006 cm) gold foil . He established that the nucleus was: very dense, very small and positively charged. He also assumed that the electrons were located outside the nucleus.
1914	H.G.J. Moseley	Using x-ray tubes, determined the charges on the nuclei of most atoms. He wrote "The atomic number of an element is equal to the number of protons in the nucleus". This work was used to reorganize the periodic table based upon atomic number instead of atomic mass.
1919	Aston	Discovered the existence of isotopes through the use of a mass spectrograph.
1922	Niels Bohr	Developed an explanation of atomic structure that underlies regularities of the periodic table of elements. His atomic model had atoms built up of successive orbital shells of electrons.

1923	de Broglie	Discovered that electrons had a dual nature-similar to both particles and waves. Particle/wave duality. Supported Einstein.
1927	Heisenberg	Described atoms by means of formula connected to the frequencies of spectral lines. Proposed Principle of Indeterminacy - you can not know both the position and velocity of a particle.
1929	Cockcroft / Walton	Built an early linear accelerator and bombarded lithium with protons to produce <i>alpha particles</i>
1930	Schrodinger	Viewed electrons as continuous clouds and introduced "wave mechanics" as a mathematical model of the atom.
1930	Paul Dirac	Proposed <i>anti-particles</i> . Anderson discovered the anti-electron (positron) in 1932 and Segre/Chamberlain detected the anti-proton in 1955..
1932	James Chadwick	Using alpha particles discovered a neutral atomic particle with a mass close to a proton. Thus was discovered the neutron.
1938	Lise Meitner, Hahn, Strassman	Conducted experiments verifying that heavy elements capture neutrons and form unstable products which undergo fission. This process ejects more neutrons continuing the fission chain reaction.
1941 - 51	Glenn Seaborg	Synthesized 6 transuranium elements and suggested a change in the layout of the periodic table.
1942	Enrico Fermi	Conducted the first controlled chain reaction releasing energy from the atoms nucleus.
1950's -	New findings/particles	Follow this link to current theories about atomic structure.