



# Max Born

1882 - 1970

Awarded the Nobel Prize for Physics in 1954

Max Born was one of the famous physicists who pioneered quantum mechanics - the mathematical explanation of the behaviour of electrons in the atom. The high significance of Born's work on quantum theory was recognized by the award of the Nobel Prize for physics in 1954.

Born's early work was on crystals, particularly the vibrations of atoms in crystals. He was able to determine the energies involved in lattice (in the framework) formation, from which the properties of crystals could be derived.

Max Born was the son of a professor of anatomy at the University of Breslau. His mother died when he was four, and he was brought up by his maternal grandmother. He inherited from his mother a great love of music.

On his father's advice he attended courses at Breslau University on a wide range of subjects in both sciences and the arts, including philosophy. Born also studied mathematics and astronomy at Heidelberg and Zürich. In 1904 he enrolled at the University of Göttingen - the Mecca of German mathematics at that time.

After receiving his doctorate, Born went into military service but was discharged because of a severe asthmatic condition. He then left for Cambridge University where he studied physics with the famous physicist J.J. Thomson.



*Born studied  
the vibrations of  
atoms in crystals*



$$pq - qp = h/2\pi$$

*He is buried in Göttingen, where  
his tombstone displays his  
fundamental equation*

The outbreak of war in 1914 coincided with Born's acceptance of a chair in the University of Berlin. There he had the opportunity to work with Plank and Einstein, with whom he formed a lifelong friendship. It is known that, as a talented pianist, he shared with Einstein a love of music.

From 1909 until 1933 he taught at Göttingen, being appointed professor of physics in 1921. There he developed his new quantum theory. At the time, it was known that in some circumstances light, electrons, etc., behaved as waves, whereas in others they acted like particles. Born's interpretation was that the particles exist but are 'guided' by a wave. The square of the wave amplitude indicates the probability of finding a particle there.

In 1933, with the rise of Hitler he, as a Jew, left Germany, and went to Cambridge. Whilst there he wrote his popular books: '*Atomic Physics*' and '*The Restless Universe*'. Later, he became Tait Professor of Natural Philosophy at the University of Edinburgh.

Born married Hedwig Ehrenberg, the daughter of a professor of Law. The couple had three children, of whom the son, Gustav, would later become a pharmacologist.

Born retired at the age of 70 and returned to Germany. In his last years, he was especially active in writing and speaking about the social responsibility of scientists. He was one of the signatories of the Declaration condemning the development of atomic weapon.