



Hendrik Antoon Lorentz

1853 - 1928

Awarded the Nobel Prize for Physics in 1902

In the early 1890s electrons had not yet been discovered. The famous Dutch physicist Hendrik Lorentz postulated the existence of tiny charged particles to explain a number of physical phenomena. Lorentz argued that electromagnetic radiation is produced by the vibration of these charged particles. Soon, the English physicist J.J. Thomson discovered these particles ('electrons') experimentally.

You may know that the spectral lines are an optical phenomenon, and they appear when the light from a gas flame is split into different colors. An important consequence of Lorentz's electron theory was the prediction that spectral lines would split if the source of light from which they come is placed within a strong magnetic field. **Lorentz supposed that the presence of a magnetic field would alter the motion of the charged particles in the light source** which produced the spectral lines, causing them to shift their position.

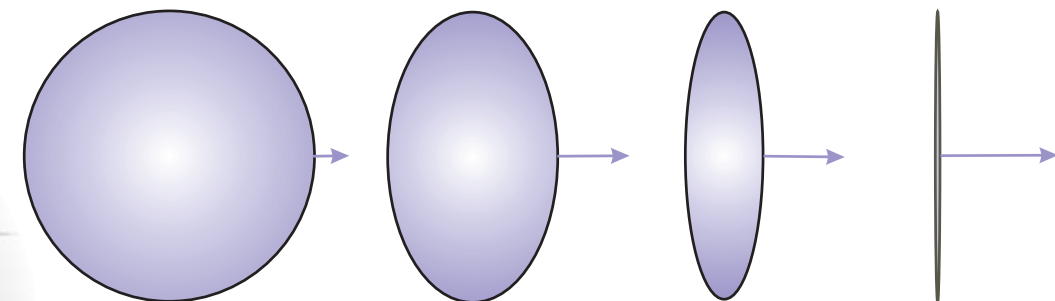
In 1902 Lorentz and his countryman Pieter Zeeman were awarded the Nobel Prize for Physics for the discovery and explanation of the splitting of spectral lines.

Hendrik Antoon Lorentz was born in Arnhem in the Netherlands, on July 18th, 1853. His father was the owner of a nursery, his mother died when Hendrik was only four years old, and his father married for a second time. The stepmother seemed to have taken good care of him and his younger brother.

When Hendrik was six, he went to study in Master Swatter's school, at that time one of the best in Arnhem. Soon he became first in his class. Under a good teacher, who recognized his talents, Hendrik, at nine, could use the tables of logarithms. At the age of thirteen he entered the High School in Arnhem. As a student he excelled in everything he undertook. He was very keen on reading, mostly books on history, and also those of Walter Scott and Charles Dickens.



*Lorentz was
born in the
Netherlands*



$$L = L_0 \sqrt{1 - v^2/c^2}$$

*He explained mathematically the
length contraction of an object
moving at relativistic speed*

In 1870 Lorentz entered the University of Leiden, where he studied physics and mathematics. During his student life Lorentz got acquainted with the works of the great James Clerk Maxwell, the originator of the electromagnetic theory of light. After passing his exams he returned to Arnhem to prepare for his doctorate. Over the next two years he supported himself by teaching in the local school.

In 1875 he was awarded the PhD for his thesis 'The Theory of Reflection and Refraction of Light'. **At the age of 24 he was offered a Professorship of Theoretical Physics in Leiden.**

Once, during the summer holiday, Lorentz met the pretty Aletta Kaiser, the daughter of a Professor at the Academy of Fine Art. In 1881 the young couple married. The marriage seems to have been a happy one. Aletta devoted herself to her husband, and became a real help to him. They brought up two daughters and a son.

Lorentz is remembered as a sociable man with a marked sense of humour and a gift for conversation; he enjoyed a cigar and a glass of good wine with friends.

Apart from scientific research he was involved in the practical applications of physics. In 1920 he took charge of the calculations for the height of the dam across the Zuiderzee.

In 1906 he made his first journey to America, which was a very important event in his life. He met most of the prominent physicists of the USA. He was much impressed by the mouth of the Hudson river and the Statue of Liberty. His lectures were a great success.